INDIA
RUBBER WORLD

OUR
63rd YEAR

A BILL BROTHERS PUBLICATION

OCTOBER, 1951

Announcing Cabot's New Low-Cost Oil Furnace Black!

Sterling-V

(V for VERSATILE)

CABOT

with the Modulus of HMF
Resilience of SRF
Smooth Extrusion Typical of Oil Blacks

AVAILABLE IN CARLOAD QUANTITIES

YOU CAN CUT THE COST OF A PASSENGER-CAR TIRE

WITH DU PONT

THIONEX-MBTS

ACCELERATION

IF YOUR PRESENT ACCELERATOR COSTS are over 35¢ per 100 pounds of GR-S, it will pay you to investigate Thionex-MBTS. Depending on the accelerator it is compared with, savings up to one-half are possible.

What's more, there is no sacrifice in processing safety or tire quality. Factory experience has proved this combination to be safe processing. Road tests show Thionex-MBTS accelerated treads deliver long mileage.

Consult Report BL-235 for complete information. Extra copies are available. Ask your district office or write, E. I. du Pont de Nemours & Co. (Inc.), Rubber Chemicals Div., Wilmington 98, Delaware.

DU PONT RUBBER CHEMICALS

E. I. du Pont de Nemours & Co. (Inc.), Wilmington 98, Del.

DU PONT

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

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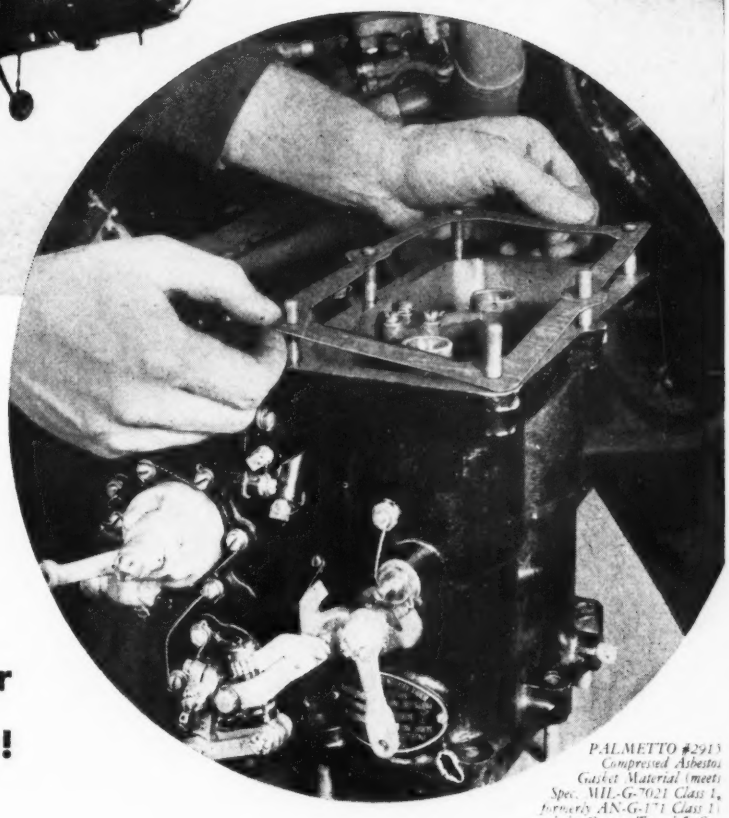
Another new development using

B. F. Goodrich Chemical Company ***raw materials***

Mission accomplished!



PALMETTO #2913 Compressed Asbestos Gasket Material (meets Spec. MIL-G-7021 Class 1, formerly AN-G-17 Class 1) made by Greene, Tweed & Co., North Wales, Pa.

Hycar helps seal power in—keep trouble out!

BEFORE that Navy helicopter was ever built, every part in it had to pass rigid performance tests—must have an ample margin of safety. The carburetor gasket pictured—made with Hycar—ran up a perfect score!

The gasket's job is to provide an air-tight seal . . . to keep fuel vapors in, and keep out oil and other substances that can cause carburetor trouble.

See how Hycar helps do this job so well. Hycar bonds the asbestos fibers of the gasket material—resists heat, oil, solvents—retains its high tensile strength. It helps make the gasket non-absorbing, non-swelling, non-cracking.

Hycar has advantages that make it ideal for many defense and civilian uses. It resists oil, gas, abrasion, weather and wear—and more hard-to-meet conditions. Demand for Hycar materials exceeds present supplies, but limited quantities are available for development work. For technical bulletins, advice, please write Dept. HB-5, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio. Cable address: Goodchemco.

B. F. Goodrich Chemical Company
A Division of The B. F. Goodrich Company

GEON polyvinyl materials • HYCAR American rubber • GOOD-RITE chemicals and plasticizers
HARMON organic colors

Need extreme temperature resistance? Hycar has it—plus abrasion resistance and more advantages.

Hycar
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American Rubber

Intricate shapes . . . true to the die . . .

Philblack* A *is the reason why!*

Get an eyeful of this! Philblack A is the molder's delight! Makes it easy to produce difficult, intricate shapes, from thin wall tubings to accurate channel strips. And smooth feather edges, glossy surfaces, pliancy and suppleness give your products eye-and-touch appeal.

Order Philblack A in bags or in bulk for use in natural, synthetic or cold rubber. Consult us about your specific problems. Our technical representatives are experts in resourceful, economical rubber compounding with Philblack A.

PHILLIPS CHEMICAL COMPANY

PHILBLACK SALES DIVISION

EVANS BUILDING · AKRON 8, OHIO

PHILBLACK EXPORT SALES DIVISION · 80 BROADWAY · NEW YORK 5, N. Y.

* A Trademark

Philblack A and Philblack O are manufactured at Borger, Texas. Warehouses in Akron, Boston, Chicago and Trenton.
West Coast agent: Harwick Standard Chemical Company, Los Angeles. Canadian agent: H. L. Blachford, Ltd., Montreal and Toronto.

NAUGATUCK ANNOUNCES:

a new blowing agent

for Natural or Synthetic Rubbers, Plastics and Plastisols

Celogen

NON-TOXIC — NON-DISCOLORING — NON-STAINING — ODORLESS

Used Alone or as an Auxiliary with Sodium Bicarbonate For Fine Uniform Cell Structure—Open or Cellular

ESPECIALLY RECOMMENDED FOR

* Continuous cure, fine sheet sponge
* Rug underlay—safe for floor finishes
* Upholstery materials—arm-rests, cushions
* Sponge gaskets contacting lacquered finishes
* White or light-colored sponge, free of light discoloration
* Sponge soling—fine, even cellulation
* General purpose molded sponge requiring sharp definition
* Low-density cellular expanded plastics for insulation, or buoyant type products for military or commercial use

PROCESS • ACCELERATE • PROTECT with NAUGATUCK CHEMICALS

Naugatuck Chemical Division of United States Rubber Company

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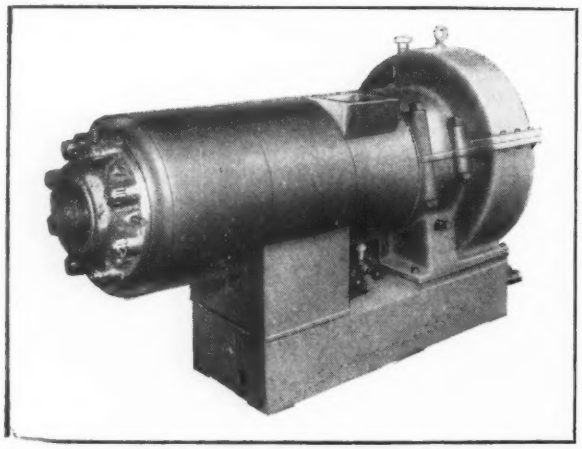
Rubber Chemicals • Aromatics • Synthetic Rubber • Plastics • Agricultural Chemicals • Reclaimed Rubber • Latices

PROCESSING MACHINERY BULLETIN

Reporting News and Machine Design Developments

IN BUSINESS TO **NRM** REDUCE YOUR COSTS

CUT MIXING COSTS WITH NRM'S NEW CONTINUOUS MIXING EXTRUDERS



MIL-X-TRUDER

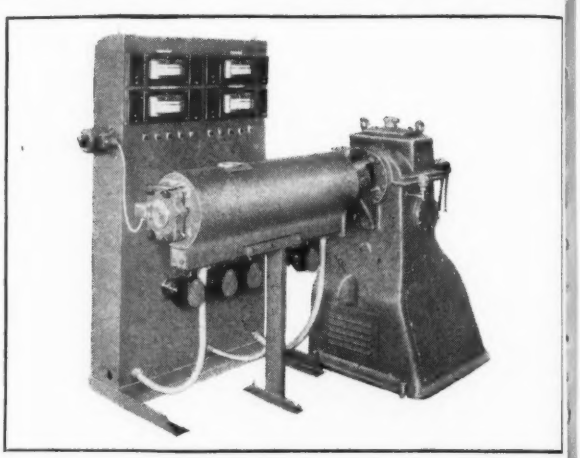
eliminates warm-up mill

Many materials that have been difficult to mix and extrude now can be handled continuously by the new NRM Mil-X-Truder. Special NRM construction features permit internal recirculation of material passing through the Mil-X-Truder. This means added mixing for "hard to mix" stocks, the elimination of warm-up mills on standard stocks, plus savings in floor space, labor and maintenance.

Stocks can be fed into the NRM Mil-X-Truder in pelletized or strip form. Sticky and asbestos loaded materials can be extruded with accuracy, powders can be compacted and natural and synthetic rubbers can be mixed and extruded without the use of a warm-up mill.

STRAINING

If you strain foreign matter from rubber or plastic compounds, investigate the new NRM Mil-Strainer. The Mil-Strainer is a Mil-X-Truder equipped with NRM's new Quick-Opening strainer head and Flared Head Screw.



TWO-STAGE EXTRUDER

eliminates initial compounding and drying

Now you can stop paying premium prices for special short order compounds. With the new NRM Two-Stage Extruder compounds can be quickly mixed in your own plant from a simplified inventory of basic materials.

The NRM Two-Stage Extruder, the first single screw extruder to incorporate colloiding, devolatizing and extruding, eliminates initial compounding and drying of compounds. In one operation the NRM Two-Stage Extruder mixes, dries and extrudes pre-blended wet acetate, acrylic and polystyrene compounds to be pelletized directly at the die or in a chopper. It will pay you to investigate the NRM Two-Stage Extruder.

Substantial savings in production time can be realized, shorter deliveries can be quoted, inventory can be reduced and reliance on outside sources for compounds can be avoided. There's an NRM Two-Stage Extruder to meet your requirements.

WRITE FOR COMPLETE DETAILS

NATIONAL RUBBER MACHINERY CO. General Offices & Engineering Laboratories Akron 8, Ohio

PLANTS at Akron and Columbiana, Ohio and Clifton, N. J.

AGENTS East: National Rubber Machinery Co., Clifton, N. J.
West: S. M. Kipp, Box 441, Pasadena 18, Calif.

Creative Engineering

maximum whiteness -softness-protection against oxidation with *Wing-Stay S*

The maker of this foamed rubber powder puff needed maximum retention of whiteness and softness—coupled with low-cost protection against oxidation—in his product. WING-STAY S was his answer.

WING-STAY S—developed by Goodyear for the rubber industry—offers the best balance of antioxidant properties, superior nondiscoloring characteristics and economy of any antioxidant material. That's why so many makers of natural rubber items, latex products and light-colored or white molded and extruded articles turned to WING-STAY S. Now, its use in all GR-S 26 makes this rubber the ideal synthetic for a wide range of light-colored items.

Although WING-STAY S is currently in short supply, now is the time to evaluate this use-proved antioxidant in your own laboratory pending the return of full availability. Write today for full details and sample to:

Goodyear, Chemical Division
Akron 16, Ohio

PERMANENTLY WHITE, PERMANENTLY SOFT, *these powder puffs are protected against oxidation and discoloration by* WING-STAY S, *incorporated in latex foam during manufacture.*

Photos courtesy Sondra Foam Products

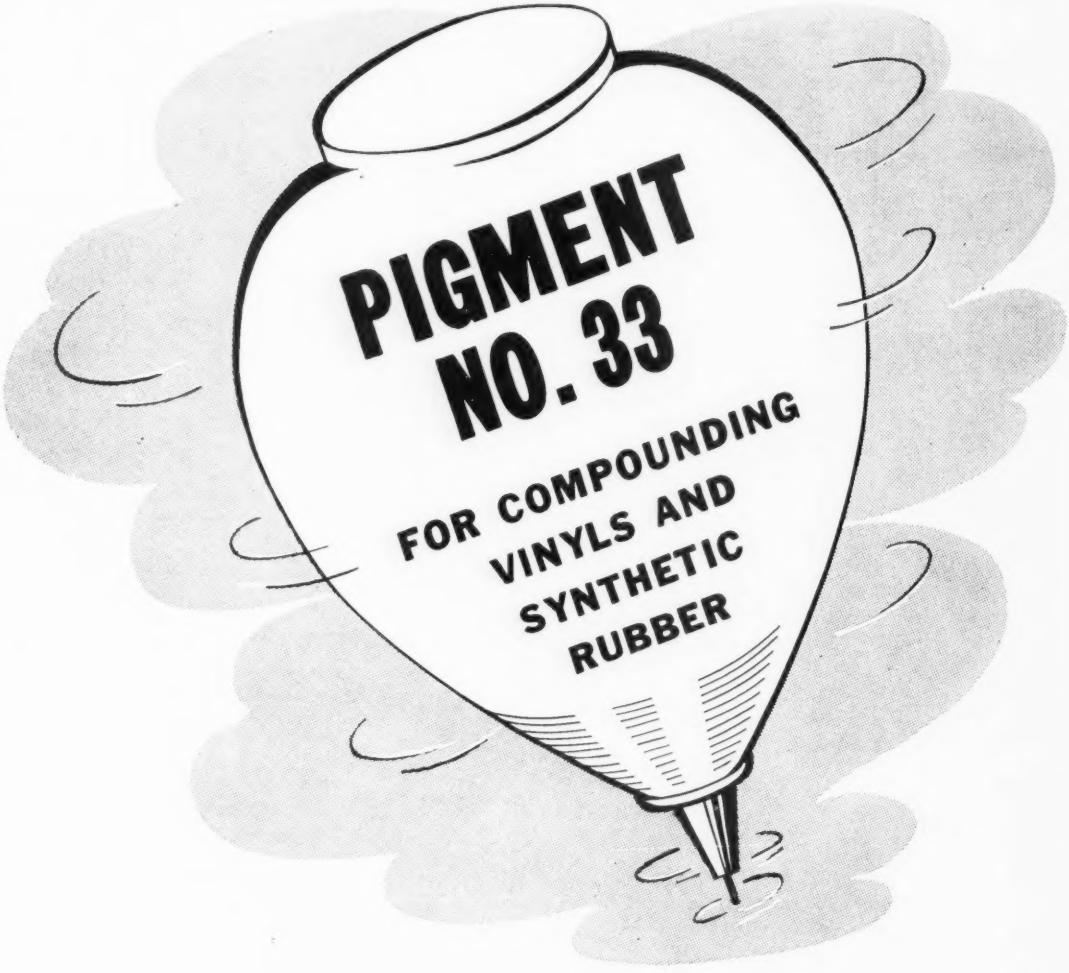
USE PROVED *Products*

GOODYEAR

We think you'll like "THE GREATEST STORY EVER TOLD"—Every Sunday—ABC Network

Wing-Stay—T.M. The Goodyear Tire & Rubber Company, Akron, Ohio.

IT'S "TOPS"



• SUPERIOR ELECTRICAL TESTS
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• COLOR

Sample and technical data sent promptly on request

SOUTHERN CLAYS, Inc.

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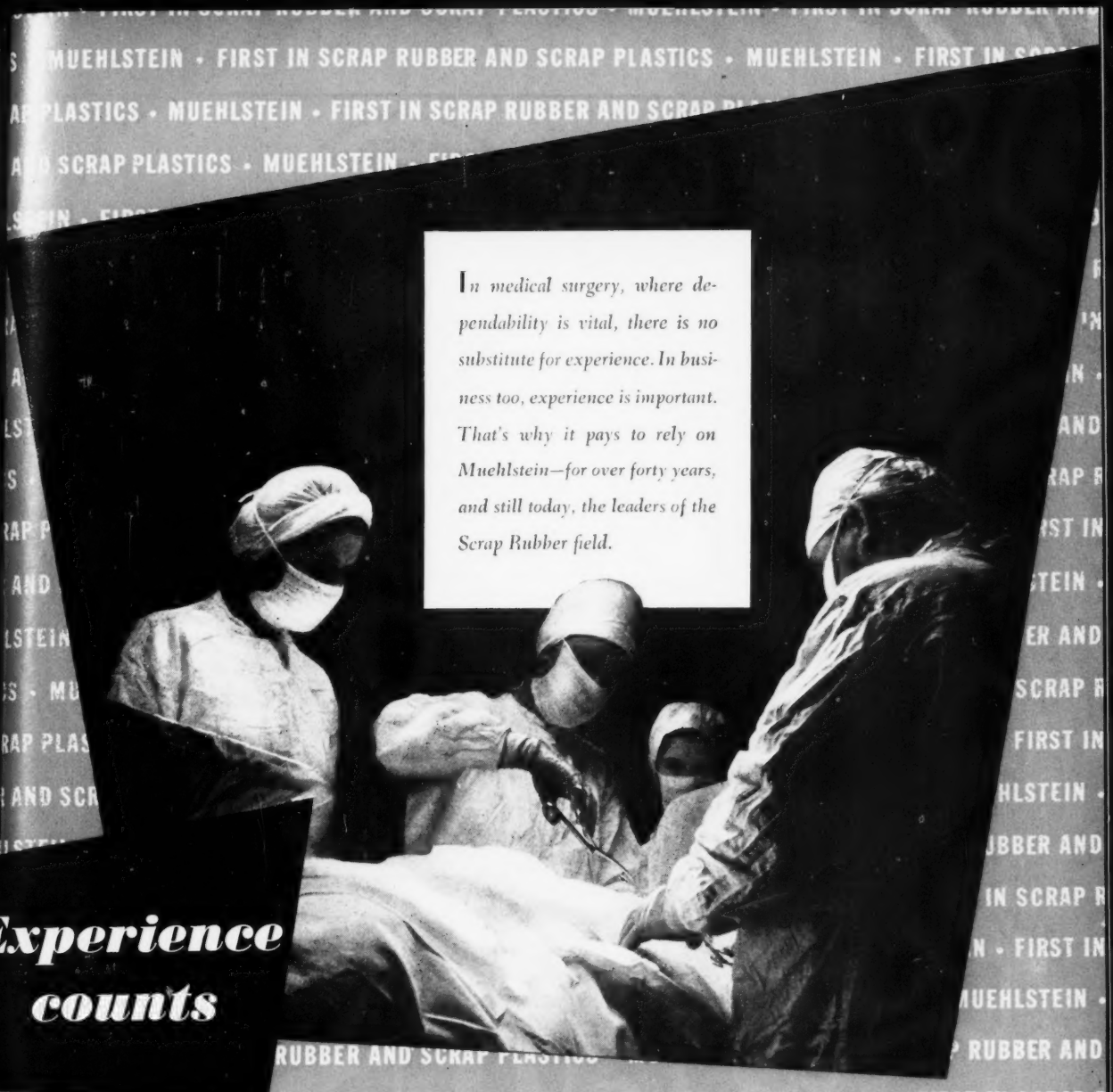
In medical surgery, where dependability is vital, there is no substitute for experience. In business too, experience is important. That's why it pays to rely on Muehlstein—for over forty years, and still today, the leaders of the Scrap Rubber field.
Experience counts

H. MUEHLSTEIN & CO. INC.

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CRUDE RUBBER · SYNTHETIC RUBBER · SCRAP RUBBER · HARD RUBBER DUST · PLASTIC SCRAP

SUBLAC

non-scorching RESIN

a synonym for saving

SUBLAC Resin B-2-A, a white powder, is the lowest priced, non-scorching reinforcing resin available today!

SUBLAC Resin is outstanding in its ability to impart desirable characteristics to rubber compounds. For example, it may be used to obtain any of these properties: Hardness, Stiffness, Abrasion Resistance, Tear Resistance, Oil Resistance. In many cases, the use of **SUBLAC** Resin alone is sufficient to obtain a combination of several of these properties and at the same time provide a compound with easy processing characteristics and a high general order of physicals. *In addition,* **SUBLAC** Resin is *non-scorching!*

SUBLAC Resin B-2-A is especially advantageous in stocks highly loaded with clay, whiting, or Silene. The following compounds are representative of such highly loaded, easy processing stocks that require no 'trick' mixing techniques:

Experimental Slab Stock		Experimental Tile Stock	
GR-S 521	100	GR-S 521	100
SUBLAC Resin B-2-A	30	SUBLAC Resin B-2-A	30
Circo Light	35	Circo Light	15
ZnO	5	ZnO	5
DPG	.15	DPG	.5
Altax	2.13	Altax	2.13
Hard Clay	300	Hard Clay	200
Sulfur	3.70	Whiting	150
		Sulfur	8
	Cure 10′ @ 320° F.		
Tensile	950		
Elongation	450%		
Shore Hardness (A Scale)	97-98	Shore Hardness (D Scale)	60-61

In these compounds, the **SUBLAC** Resin was added to the rubber, then enough clay to take up all of the oil, followed by the remainder of the ingredients in the usual manner.

SUBLAC Resin B-2-A is readily available. ***Send for your sample today!***

Prices | 29½c lb. in truck loads
30c lb. in lesser quantities
fob factory in fiber drums

THE POLYMEL CORP.

1800 Bayard Street
Baltimore 30, Maryland
Phone: PLaza 1240

Use United Blacks

UNITED CARBON COMPANY, INC.

CHARLESTON 27,
WEST VIRGINIA

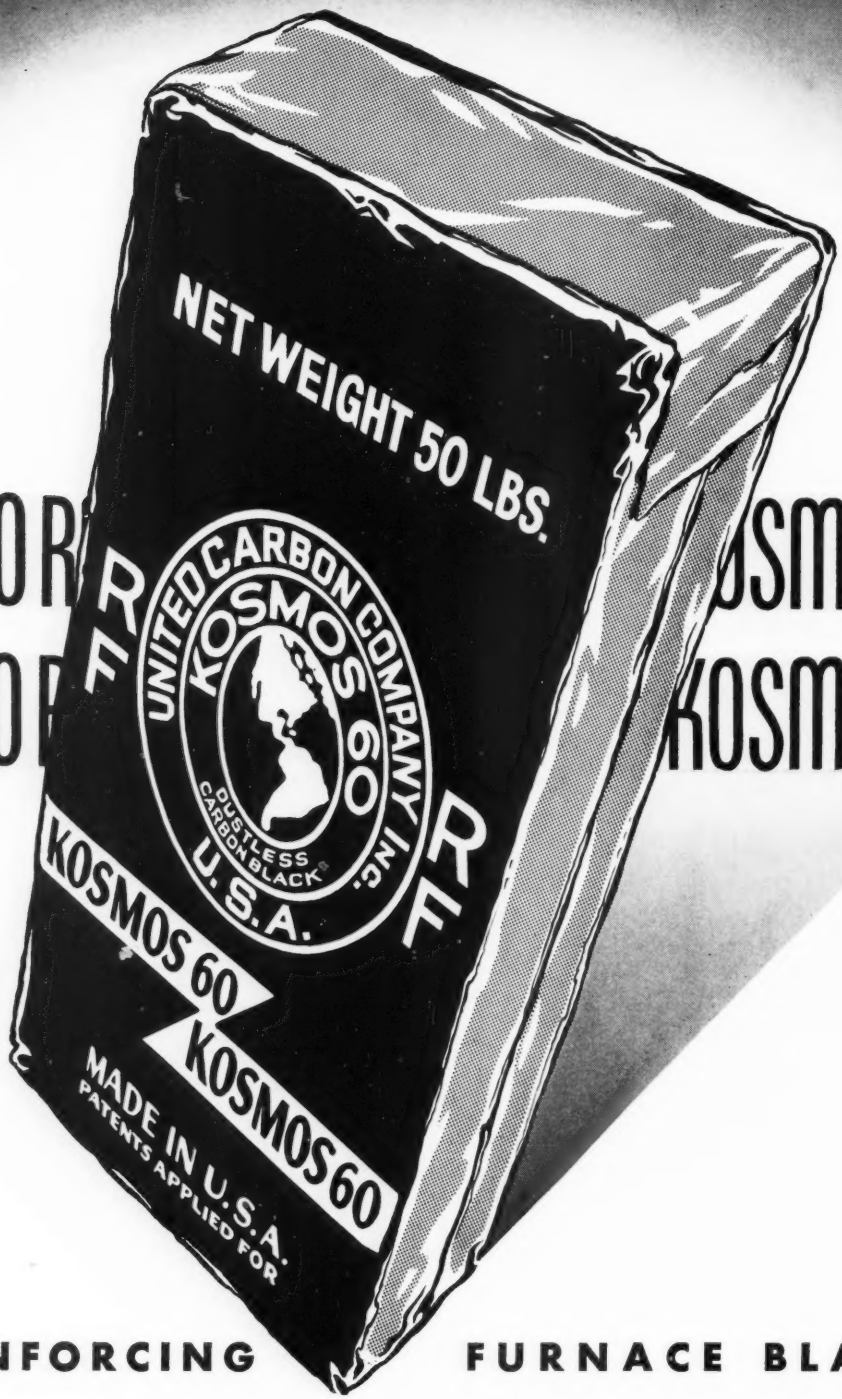
NEW YORK • AKRON • CHICAGO • BOSTON

OSMOS 60 R

OSMOS 60

OSMOS 60

KOSMOS 60



REINFORCING FURNACE BLACK

Kosmos 60 (an R F black) is an extraordinarily good black because of the way it is made and what it can do. Created from a particular oil and under controlled heat and reactions in our own furnace process, Kosmos 60 is fitted for easy and efficient processing, fast extrusion, less nerve, proper smoothness, tight cure, mighty reinforcement, high electrical conductivity and superb resistance to wear and flex crack cut-growth. Standardize on Kosmos 60 to give your products the supremacy they deserve.

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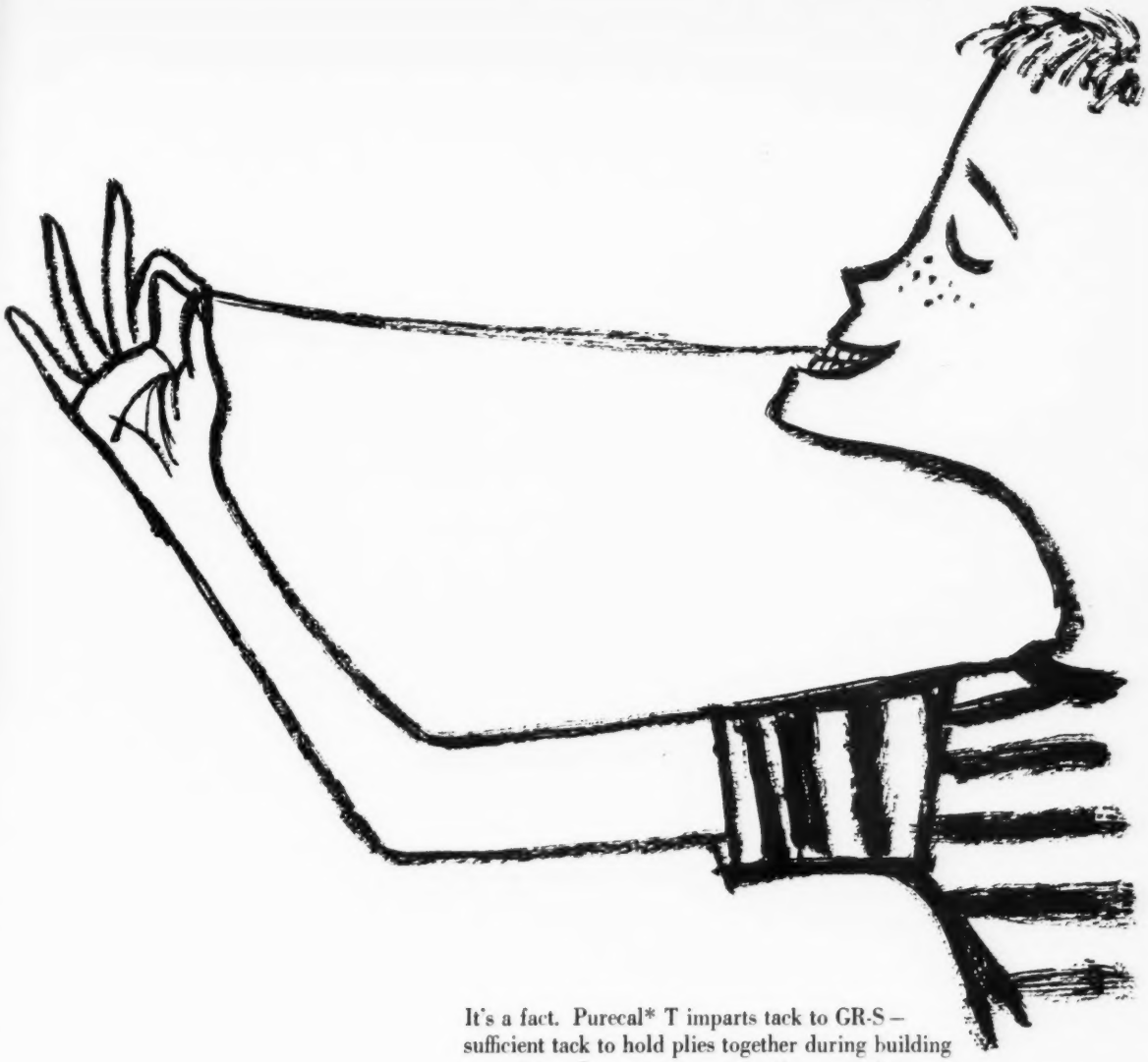


You can get tack with Purecal in GR-S

It's a fact. Purecal* T imparts tack to GR-S – sufficient tack to hold plies together during building operations. In most cases, cementing operations can be eliminated and much of the automatic building equipment used with natural rubber can be used with GR-S.

Purecal T is easier to process in GR-S than in natural rubber. It mixes easier and faster. Because of its ultra-fine qualities, it produces tack and promotes high quality in non-black stocks. Using Purecal T, you can get excellent results at low cost in passenger tire carcasses, hose and belting products, footwear and gum stripping.

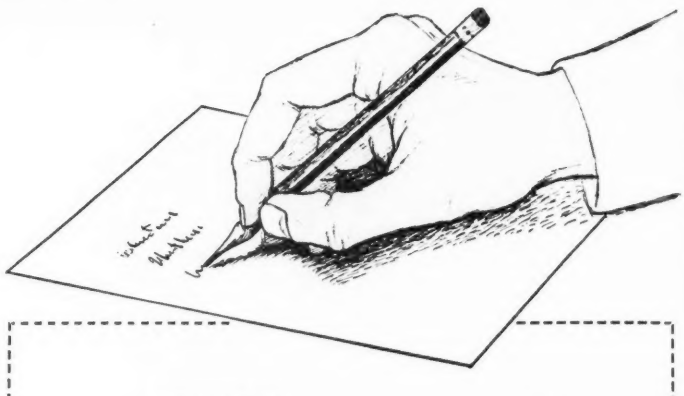
We know this – not just from laboratory tests – but mainly from work in plants. We've recorded the findings in a new booklet: "Purecal in GR-S." It contains practical information on the compounding and processing of Purecals in GR-S and cold rubber. We think you'll find it useful – we'll be glad to send it to you.

*Trademark

SODA ASH • CAUSTIC SODA • BICARBONATE OF SODA
CALCIUM CARBONATE • CALCIUM CHLORIDE • CHLORINE
HYDROGEN • DRY ICE • SYNTHETIC DETERGENTS • GLYCOLS
CARBOSE (Sodium CMC) • ETHYLENE DICHLORIDE • PROPYLENE DICHLORIDE • AROMATIC SULFONIC ACID DERIVATIVES
OTHER ORGANIC AND INORGANIC CHEMICALS

Wyandotte CHEMICALS
REG. U. S. PAT. OFF.
Offices in Principal Cities
WYANDOTTE, MICHIGAN

STOP... LOOK...and LIST 'EM!



...There may be several types of products that you need in this list of FLINTKOTE materials

Surely, there's at least *one* place in your plant or processes where materials listed on this page can serve you . . . and serve you *better.*

Maybe it's an improved kind of saturant you need. A new adhesive. Or a sizing . . . a protective coating . . . a mastic flooring emulsion . . . or products for waterproofing or dampproofing. The FLINTKOTE Line includes them all . . . and *more.* They're all *quality* products . . . all FLINTKOTE-made.

Maybe you're looking for a *brand new* product. One that improves your plant protection or your manufacturing processes. A *tailor-made* one—that no one else has been able to give you. Our research staff will be glad to help you develop it.

You can get a finished product . . . or one to use as a component in your own formulations.

We manufacture in volume . . . with plants from coast to coast.

So read the list at the right—make *your own* list—and send it to us for complete information, specifications and prices. No obligation, of course—and you'll be mighty glad to have FLINTKOTE as another reliable source of supply.

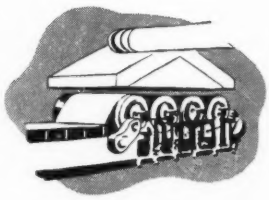
THE FLINTKOTE COMPANY
Industrial Products Division
30 Rockefeller Plaza, New York 20, N. Y.

Atlanta • Boston • Chicago Heights • Detroit
Los Angeles • New Orleans • Washington
The Flintkote Co. of Canada, Ltd., 30th St., Long Branch, Toronto, Canada

ADHESIVES

Asphalt Emulsions—cold applied
Asphalt and Rubber Compounds
Solvent Rubber Cements
Synthetic Rubber and Resin Compounds
Rubber and Resin Water Dispersions
Asphalt Tile Cements

SATURANTS and SIZINGS



Asphalt Products for Waterproofing paper, cloth, building materials
Rubber Compounds for Carpet Backing and impregnating
Binders for various compositions
Tire Cord Dipping Solutions

COATINGS

Products for Waterproofing and Dampproofing
Protection for Thermal Insulation
Corrosion-Resistant Protection
Sound-Deadening—Spray-on Anti-Slip Floor Coating
Joint and Crack Sealers—hot and cold applied
Asphalt Base Aluminum Paint

FLINTKOTE
Products for Industry

Q. How can these Rubber Products be made FASTER and EASIER at LOWER COST?

A. By using U.S. *DIP-PROCESS* RECLAIMS

Yes, if you make any of the products we have emphasized in the above illustration, as well as many others, you can achieve greater speed, greater ease of processing and greater economy by including one of the famous U. S. *Dip-process* Reclaims in your formula. In addition, you will add to, instead of detract from your quality, by using *rubber itself* as a plasticizer.

Especially suited for use with "cold" rubber, U. S. *Dip-process* Reclaims have low Mooney values. This greater plasticity means larger Banbury loadings, shorter mixing time and lower power consumption. U. S. *Dip-process* Reclaims mix and tube cooler which minimizes the danger of "scorching". AND REMEMBER . . . with U. S. *Dip-process* Reclaims, you can USE 10% LESS than with *ordinary* reclaims and GET THE SAME RESULTS. This creates ANOTHER important economy for you. Why not drop us a line, tell us what you make, and we'll send you complete details as well as samples for testing purposes. U. S. Rubber Reclaiming Company, Inc., P. O. Box 365, Buffalo 5, N. Y. Trenton agent: H. M. Royal, Inc., 689 Pennington Ave., Trenton, N. J.

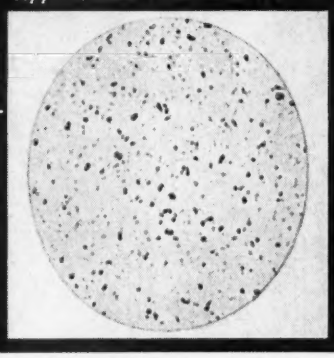
68 years serving the industry solely as reclaimers

U.S. RUBBER RECLAIMING COMPANY, INC.

for finest quality

RUBBER AND LATEX PRODUCTS

Magnification 1500X
Approx. Scale: 1 Micron = 1/16 in.



ST. JOE BLACK LABEL #20

A fast curing type of very fine particle size, giving maximum reinforcement and activation in rubber.

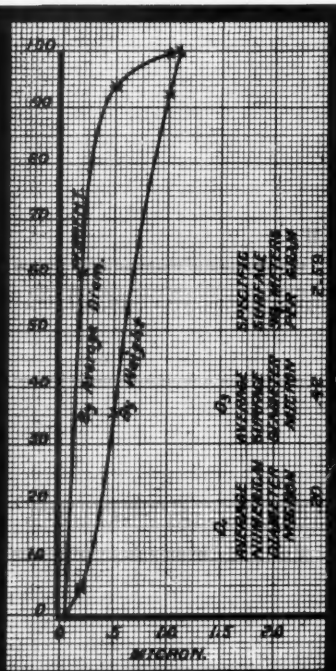
Representative Chemical Tests

ZnO	99.20%
Pb	.03
Cd	.01
Mn	.003
Cu	.002
Acidity as SO	.03
Total S as SO	.05
H_2O soluble salts	.15
Insoluble in HCl	.15
Loss at 110° C.	.30

Representative Physical Tests

Particle size

Average numerical diameter D_1 – microns	.20
Average surface diameter D_2 – microns	.42
Specific surface – Sq.M./gram	2.59
Percent fines under .50 micron	35.0
Specific gravity	5.65
Apparent density – lb./cu. ft.	22.
Cleanliness	
Percent thru 325 mesh screen	99.97



Particle Size Distribution

ST. JOSEPH LEAD COMPANY
250 PARK AVE.
NEW YORK CITY 17
Plant & Laboratory: Monaca (Josephtown) Pa.

For the finest quality products made from rubber and latex we recommend St. Joe Black Label #20 lead-free Zinc Oxide. Its uniform, extremely fine particle size develops maximum effectiveness of activation and reinforcement because of the greater particle surface area made available for reaction. Its uniform low acidity aids materially in the production of fast curing compounds.

Complete physical and chemical properties of St. Joe rubber grade zinc oxides are described in our new technical manual, ST. JOE ZINC OXIDES. Write for your free copy—on your company letterhead please.

top impact resistance thanks to Plio-Tuf

USE PROVED *Products*

LIGHTWEIGHT football helmets with the exact combination of hardness and rigidity needed for safety and protection of players now are in use on many of the country's gridirons—thanks to PLIO-TUF—Goodyear's combination of rubber and reinforcing resin.

This versatile material may be compounded by users—combining PLIOLITE S-6, Goodyear's use-proved styrene-butadiene copolymer, with the rubber of their choice—giving a wide range of characteristics to meet specific requirements of hardness, rigidity, impact resistance and specific gravity. PLIO-TUF compounds in a wide range of colors may be made, too.

Because of the versatility of this resin-and-rubber combination, such uses as industrial safety helmets, sporting goods, textile spools, tote boxes, chemical containers, etc., are only an indication of the potential PLIO-TUF offers to manufacturers.

Although the resins used in PLIO-TUF—PLIOLITE S-6 or S-6B—are currently in short supply, your laboratory can secure samples for full evaluation now. Write for full information and samples to:

Goodyear, Chemical Division
Akron 16, Ohio

TESTED AND APPROVED *in play, this football helmet combines protection and lightness where both are all-important. It's made of* PLIO-TUF—*a rubber-resin combination developed by Goodyear.*

(Photo courtesy Wilson Sporting Goods Co.)

GOODYEAR

We think you'll like "THE GREATEST STORY EVER TOLD"—Every Sunday—ABC Network

Plio-Tuf, Pliolite—T.M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

DETROIT PUBLIC LIBRARY

For VINYL INSULATED
wire and cable compounds

—TO IMPROVE ELECTRICAL QUALITY
—TO IMPROVE HEAT AGING PROPERTIES
—TO GIVE HIGHER DEGREE OF UNIFORMITY

USE . . .

BURGESS PIGMENT NO. 30

(U. S. Pat. 2307239) An anhydrous kaolin-type clay for compounding vinyl insulating compounds. Reinforcing agent and filler in synthetic rubber compounds. Yields excellent processing characteristics and high insulation resistance values in vinyl electrical compounds. High degree of uniformity with respect to specific resistance, color, and brightness.

MORFLEX NO. 100 (DIOP)*

New octyl phthalate-type plasticizer characterized by extreme stability, excellent heat aging resistance, low migration, retention of light transmission and superior electrical quality.

MORFLEX NO. 200 (DIOS)*

New octyl sebacate-type plasticizers characterized by excellent heat aging resistance, retention of light transmission, and superior electrical quality.

(Manufactured by Morton-Withers Chemical Co., Greensboro, N. C.)

Write for samples and technical data.

Burgess Pigment COMPANY

HYDROUS AND ANHYDROUS KAOLIN PIGMENTS · CLAYS · ANTISUN WAX · PLASTICIZERS · WHITINGS · MINERAL COLORS.

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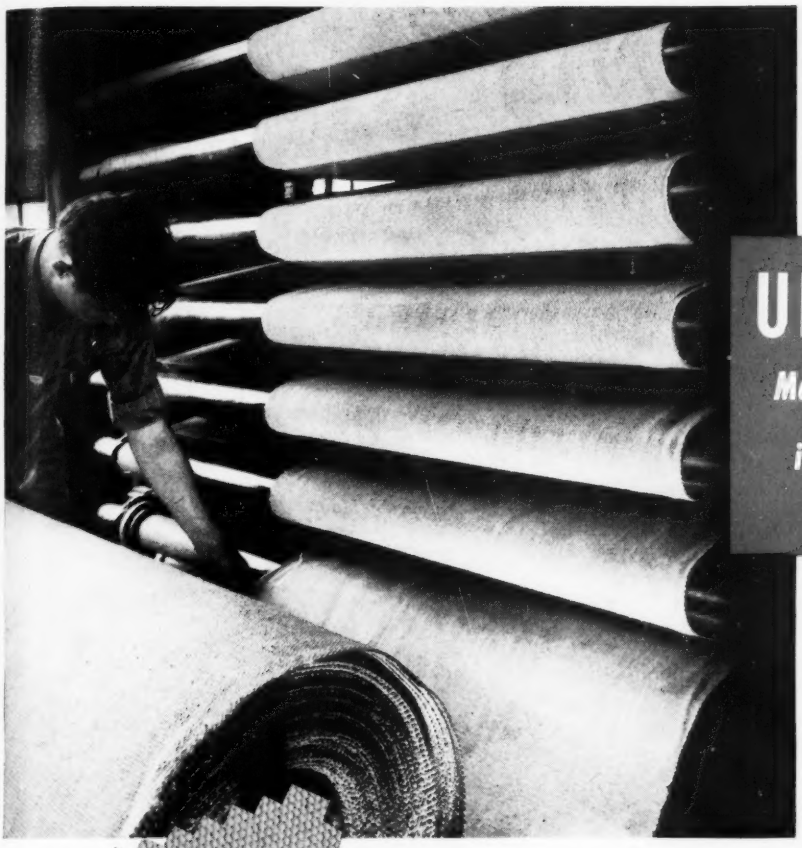

UNIFORMITY

Makes the Big Difference in INDUSTRIAL *Fabrics*

MT. VERNON FABRICS

Give You Greater Fabric Uniformity

The greater uniformity of Mt. Vernon fabrics means *consistent* quality in your finished products — smoother, more efficient fabrication.

AT YOUR SERVICE

Mt. Vernon-Woodberry's staff of textile engineers is available on request to help you with your problems in development or application of industrial fabrics.

Mt. Vernon - Woodberry Mills

TURNER HALSEY
COMPANY
Selling Agents
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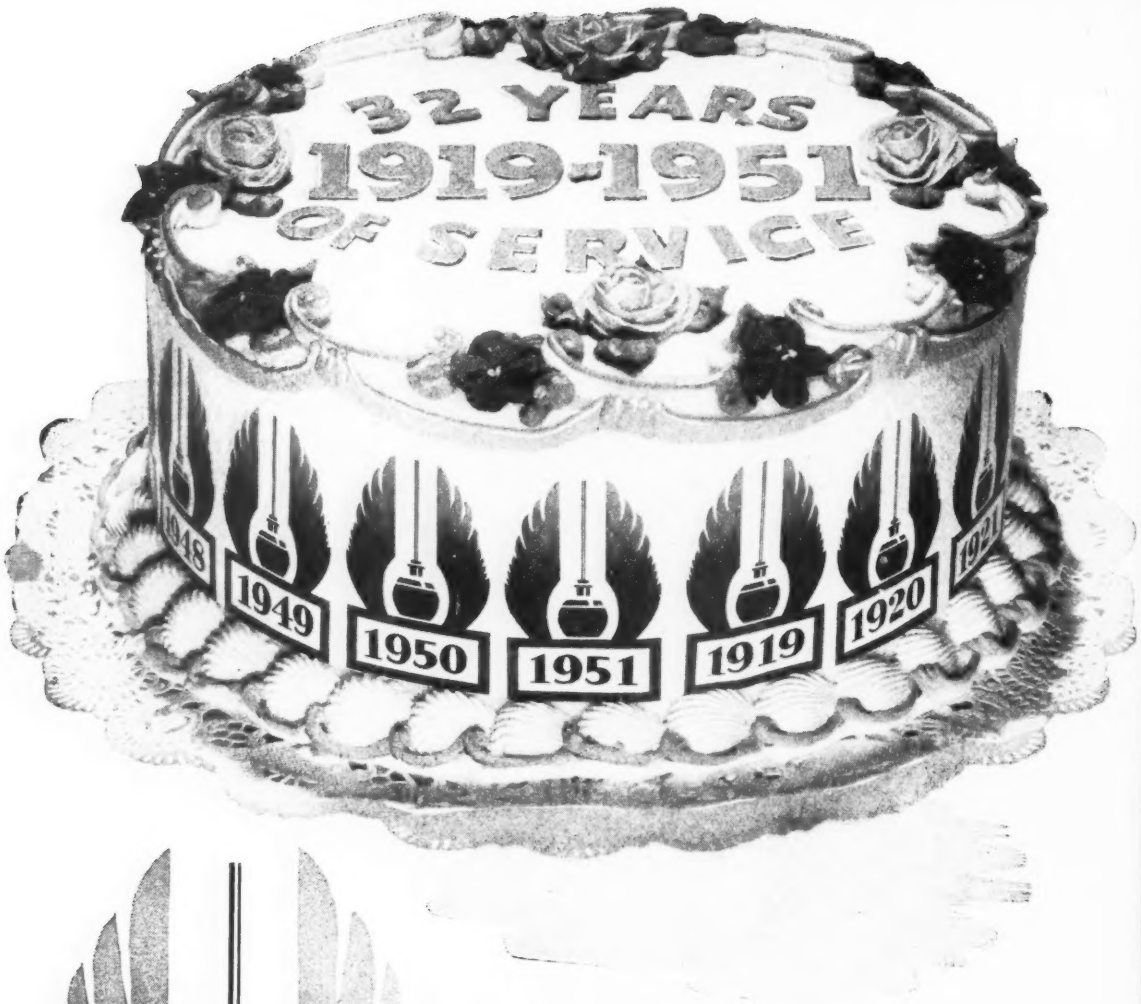
DETERMINING YARN NUMBER WITH SUTER SCALES After Breaking Skein. One of a series of comprehensive laboratory controls throughout production to assure uniformity in all Mt. Vernon-Woodberry products.



The C. P. Hall Co.
CHEMICAL MANUFACTURERS

This year marks the 32nd Anniversary of The C. P. Hall Company, whose high-quality compounding materials are known by the distinctive "Flame and Flask" trade mark.

From our start in 1919, with one small office, The C. P. Hall Company has steadily "grown to serve." During this past year, our FOURTH modern plant was opened in Newark, New Jersey, in response to the rubber industry's growing need for "products that perform."

We sincerely appreciate your patronage through the years and reassure you that you may continue to look to The C. P. Hall Company for products capable of even GREATER results for the rubber industry in the years ahead.

AKRON, OHIO ● LOS ANGELES, CALIF. ● CHICAGO, ILL. ● NEWARK, N. J.

what's cooking

An Improved Product or a Brand New One . . .

If it takes rubber or plastics processing "know-how", we can be of help

PRODUCTS

- Mills
- Refiners
- Crackers
- Washers
- Rubber Sheeting & Coating Calenders
- Plastic Film Calenders
- Complete Calender Accessory Equipment
- Embossing Calenders
- Pot Heaters
- Vulcanizers
- Autoclaves
- Rotocure Machines
- Multi-Platen Presses
- Automatic Curing Presses
- Belt Curing Presses
- Compression Molding Presses
- Plywood Presses
- Auxiliary Equipment

WE can develop efficient, economical production processes and equipment to meet your requirements. We believe that we can help *you* because during the past 60 years, we have been rendering similar creative engineering services to the rubber and plastics industry the world over.

Whether you need complete processing trains embracing radically new and unusual equipment, or merely improvements in conventional equipment, our engineers will work with you or for you to your complete satisfaction.

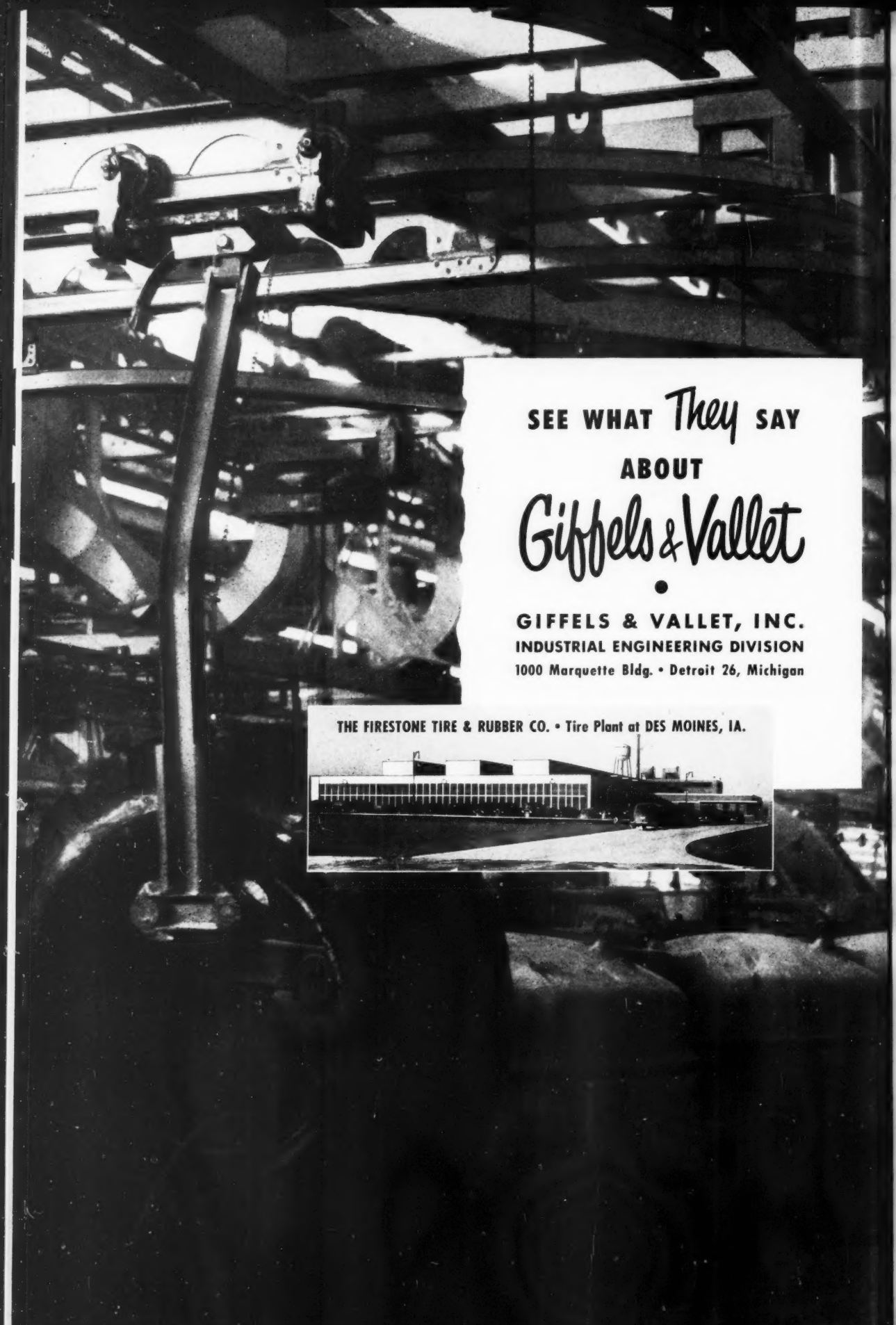
Why not call us? You will in nowise be obligated.

ADAMSON UNITED COMPANY

730 CARROLL STREET • AKRON 4, OHIO

Subsidiary of UNITED ENGINEERING AND FOUNDRY COMPANY

Plants at Pittsburgh, Vandergrift, New Castle, Youngstown, Canton



SEE WHAT *They* SAY
ABOUT
Giffels & Vallet

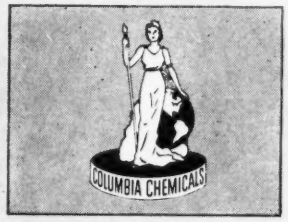
GIFFELS & VALLET, INC.
INDUSTRIAL ENGINEERING DIVISION
1000 Marquette Bldg. • Detroit 26, Michigan

THE FIRESTONE TIRE & RUBBER CO. • Tire Plant at DES MOINES, IA.

Now serving your needs as

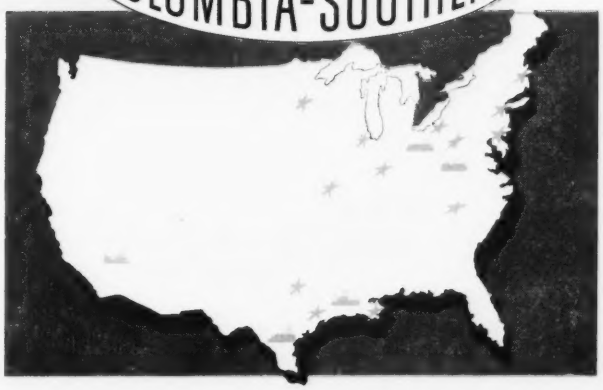
COLUMBIA-SOUTHERN CHEMICAL CORPORATION

You've known these familiar trademarks . . .



NOW LOOK FOR THIS TRADEMARK

to assure the same high quality in alkalies and related chemicals...



You can rely on the same experienced organization

Whether you've been accustomed to doing business in the past with Columbia Chemical Division of Pittsburgh Plate Glass Company, or with Southern Alkali Corporation, you'll continue to find the same competent personnel—in every department—welcoming the opportunity to serve you as Columbia-Southern . . . through strategically located plants and offices.

Production at all plants is being maintained at the highest possible levels in order to help meet the current requirements of industry. And the same district offices will continue to provide facilities that assure the most careful attention to the needs of your business.

COLUMBIA-SOUTHERN
CHEMICAL CORPORATION
SUBSIDIARY OF PITTSBURGH PLATE GLASS COMPANY

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Fifth at Bellefield, Pittsburgh 13, Pa.

PLANTS: Barberton, Ohio • Bartlett, California • Corpus Christi, Texas • Lake Charles, Louisiana • Natrium, West Virginia
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ACTIVATOR NEWS

HORSE HEAD PRODUCTS

A supplement to THE ACTIVATOR—the house organ issued by The New Jersey Zinc Company for over 15 years to aid the Rubber Industry in its use of Zinc Oxide.

UNIQUE COATING
on ZINC OXIDE outwits humidity

Customers tell us that, even in high humidity, switching to PROTOX*-166 ZINC OXIDE provides uniformly fast mixing and excellent dispersion.

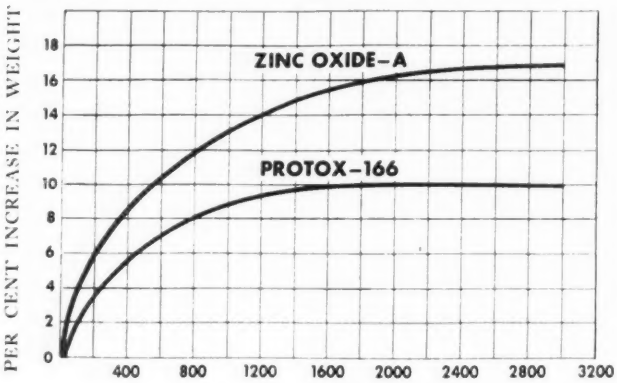
The outstanding humidity resistance of PROTOX-166 stems from the patented coating of zinc propionate that seals the individual particles. Here is how it works:

1. It reduces moisture pickup (see chart).
2. It prevents aggregation that leads to poor dispersion.
3. It is readily wetted by rubber.

*U. S. Patents 2,303,329 and 2,303,330

MOISTURE ABSORPTION OF ZINC OXIDES

under saturated conditions at 77° F.



Protox-166, surface-coated with zinc propionate, picks up less moisture in storage than do untreated types, such as Zinc Oxide-A, and thus processes more uniformly and faster.

TEST PROCEDURE

Three grams of pigment were weighed into wide-mouth (2" dia.) weighing bottles and conditioned for 24 hours over calcium chloride at room temperature. After determining the net weights of the samples, the bottles were stored, unstoppered, over water in a large container held in a constant temperature (77°F.) room. The thin layer of each sample was stirred once daily to assure a uniform condition throughout the oxide, and was weighed periodically to determine the per cent increase in weight.

NOTE: The per cent moisture pickup for zinc oxides in this test is, of course, far more than would occur under industrial storage conditions in multi-walled bags.

THE NEW JERSEY ZINC COMPANY

Producers of Horse Head Zinc Pigments

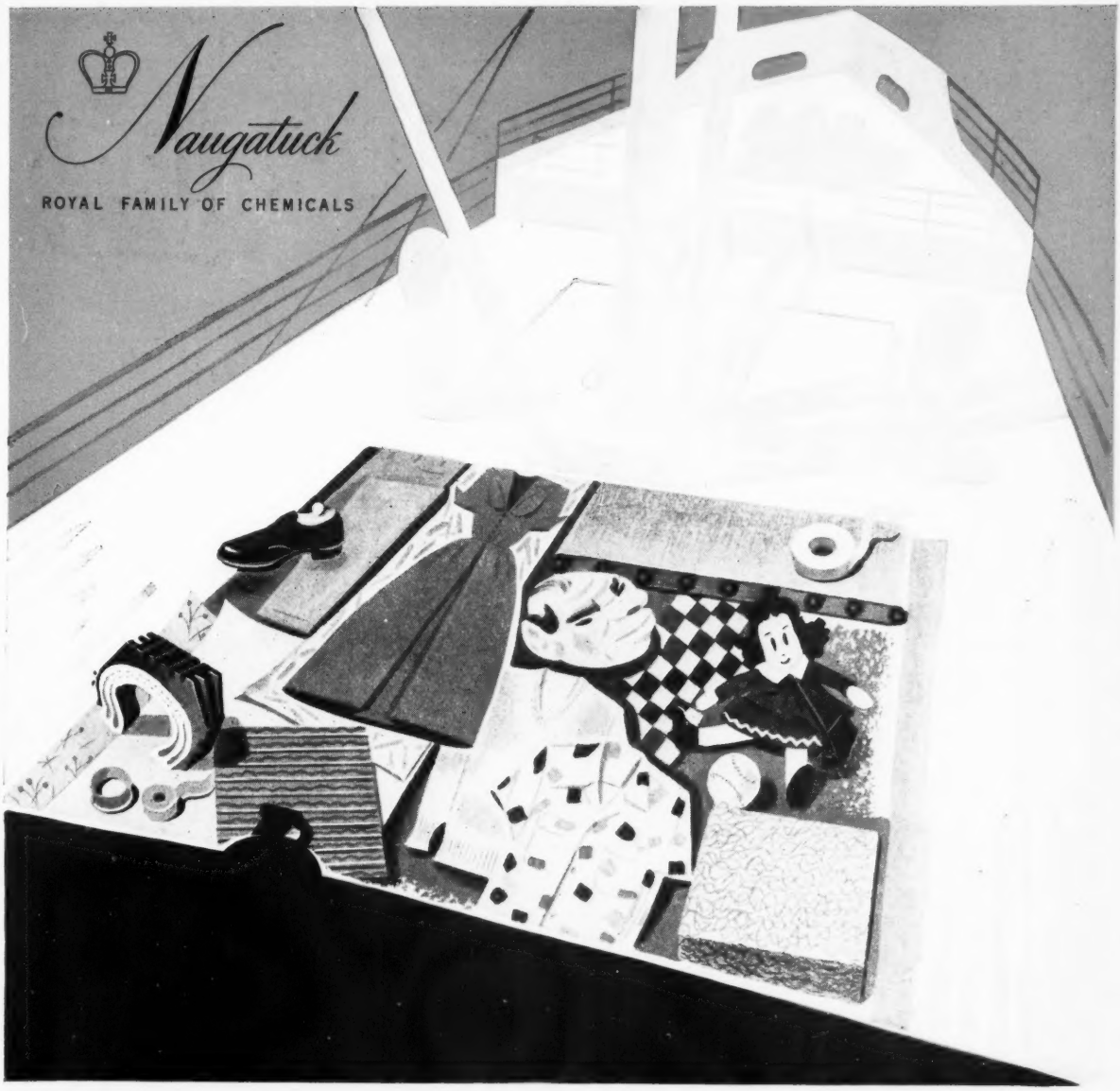
... most used by rubber manufacturers since 1852

160 Front Street, New York 38, N. Y.

HORSE HEAD PRODUCTS

Naugatuck

ROYAL FAMILY OF CHEMICALS



Good Steer for your products

If you'd add new life, looks, or quality to your products, set your course for Naugatuck. *We cover the waterfront* with a full line of Latices, Lotols and Dispersites for coatings, dippings, bondings, saturatings. *For new product ideas and new product performance, write to Connecticut address below.*

Typical Naugatuck-processed products are shown above: Tires, hair stuffing, tape, decorative paper, conveyor belts, toys, masks, adhesive, clothing. There are hundreds more—every one a better product thanks to Naugatuck.

We Cover the Waterfront

Lotol ® Compound Latices—Ready to Use.

Kralac ® Plastic Latices.

Nitrex ® Butadiene Acrylonitrile Copolymer Latex.

Shrink-Master Process for Rendering Woolens Shrink Resistant and Long Wearing.

Latex Natural and Synthetic.

Kandar ® Permanent Finish for Textiles.

Koloc ® Cationic Resin Compositions for Cotton, Rayon and Wool.

Naugatex ® Dispersed Chemical Compounding Ingredients for all Latices.

Kralastic ® Flexible Plastic Latices.

Dispersite ® Aqueous Dispersion of Rubber, Reclaimed Rubber or Resins.

Naugatuck Chemical Division of UNITED STATES RUBBER COMPANY

131C ELM ST., NAUGATUCK, CONNECTICUT

BRANCHES: Akron • Boston • Charlotte • Chicago • Los Angeles • New York • Philadelphia

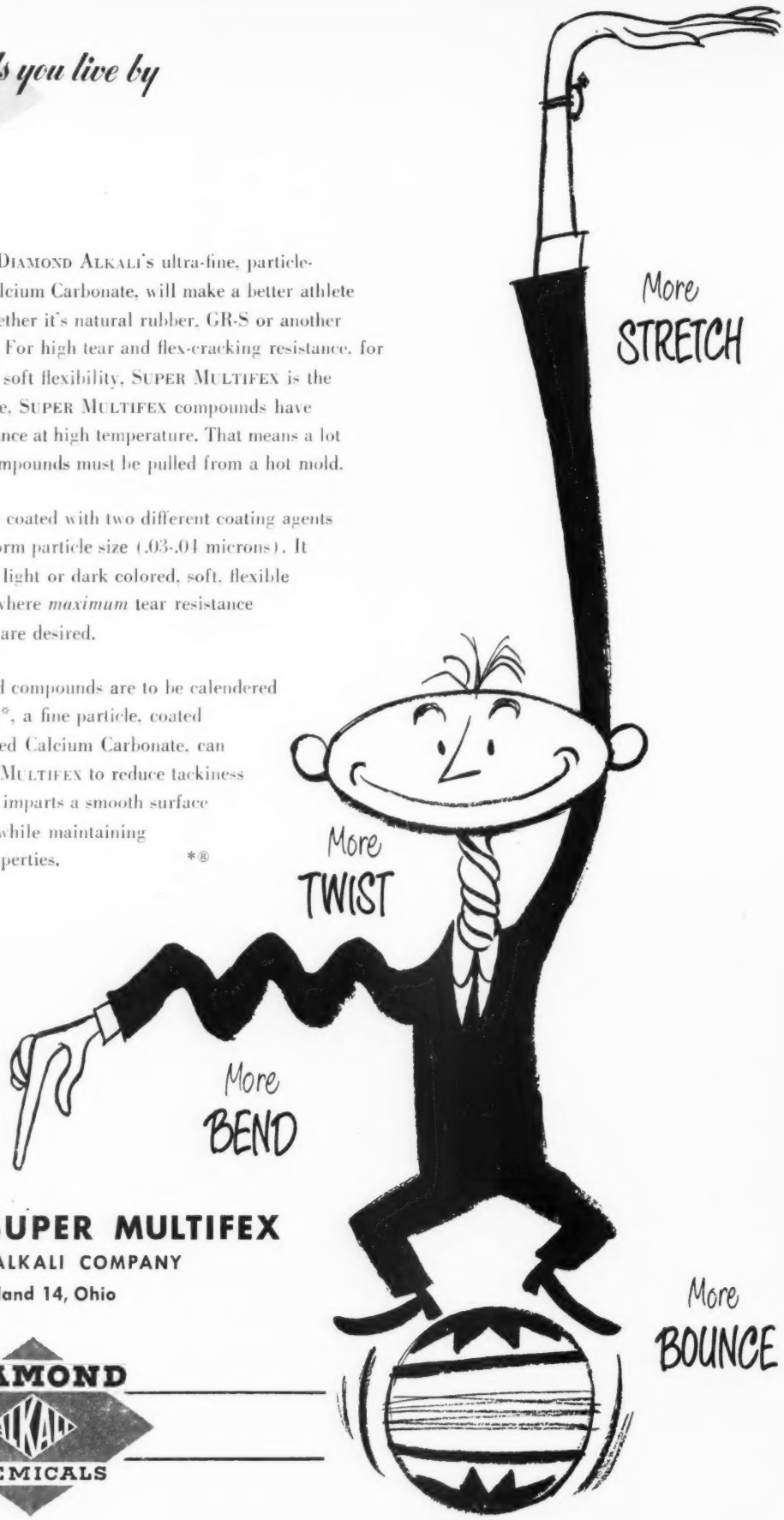
Rubber Chemicals • Aromatics • Synthetic Rubber • Plastics • Agricultural Chemicals • Reclaimed Rubber • Latices

Chemicals you live by

SUPER MULTIFEX* DIAMOND ALKALI's ultra-fine, particle-size Precipitated Calcium Carbonate, will make a better athlete of your product whether it's natural rubber, GR-S or another synthetic elastomer. For high tear and flex-cracking resistance, for tensile strength and soft flexibility, SUPER MULTIFEX is the answer. Furthermore, SUPER MULTIFEX compounds have excellent tear resistance at high temperature. That means a lot when thin-walled compounds must be pulled from a hot mold.

SUPER MULTIFEX is coated with two different coating agents and has a very uniform particle size (.03-.01 microns). It is recommended for light or dark colored, soft, flexible rubber compounds where *maximum* tear resistance and tensile strength are desired.

Where highly loaded compounds are to be calendered or extruded, KALITE*, a fine particle, coated DIAMOND Precipitated Calcium Carbonate, can be used with SUPER MULTIFEX to reduce tackiness and improve flow. It imparts a smooth surface and low shrinkage, while maintaining desired physical properties. *®



DIAMOND SUPER MULTIFEX

DIAMOND ALKALI COMPANY

Cleveland 14, Ohio

DIAMOND ALKALI CHEMICALS

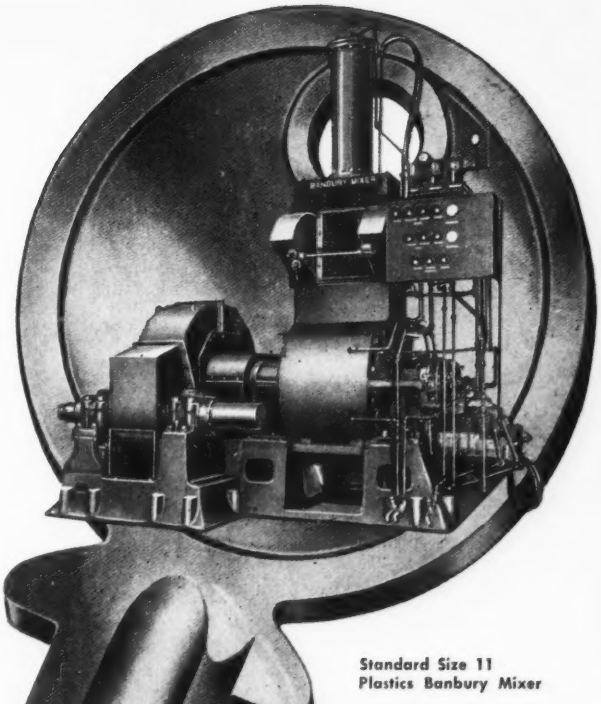
IN MANY CASES THE BANBURY PROVIDES

The Key To Efficient Processing

Where a Banbury mixer is to be an important unit in the production line, the efficiency of the entire setup can often be regulated by carefully planning the installation and operation of this unique machine in advance.

Banbury mixers are available in a wide range of sizes, which means that a machine of the proper pounds-per-hour output can be chosen to match the capacities of the other units in the line. Methods of installing Banburys have been developed which now make it possible practically to eliminate the manual handling of stock to and from auxiliary equipment.

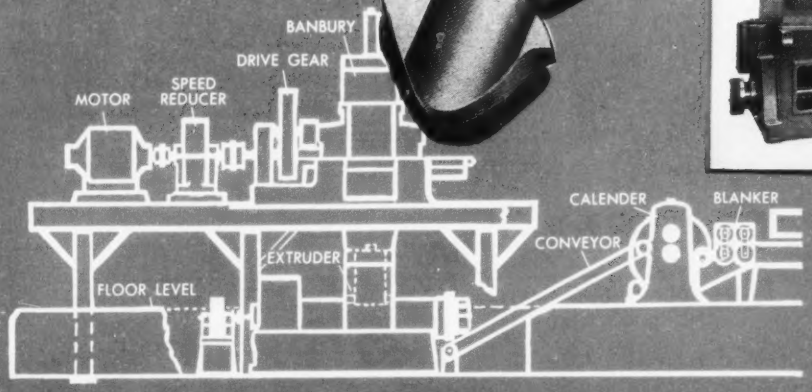
Improvements in operating technique and in the design of the machine itself have made the production of successive batches more and more uniform. With the addition of control equipment, such as a timing device, temperature recorder and discharge mechanism, each operation in the mixing procedure can be automatically controlled and an even flow of production assured.

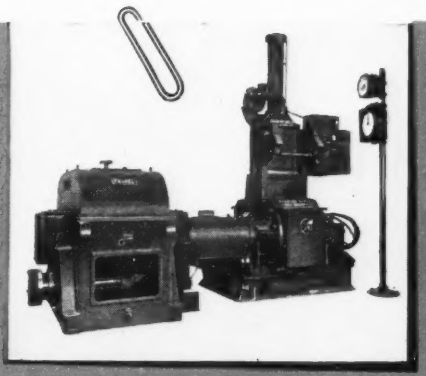


Standard Size 11
Plastics Banbury Mixer

Write for further information about the Banbury mixer or for engineering assistance in designing an efficient processing layout.

Setup for production of blanks from which phonograph records are made. The Banbury discharges directly to the extruder, which requires no operator.





Above — The size 11 Uni-Drive Banbury has all gears enclosed in a separate housing. This provides smooth, efficient power transmission under heavy loads, increasing life and reducing maintenance of gearing and other elements.

FARREL-BIRMINGHAM COMPANY, INC., ANSONIA, CONNECTICUT

Plants: Ansonia and Derby, Conn., Buffalo, N. Y. *Sales Offices:* Ansonia, Buffalo, New York, Akron, Chicago, Los Angeles, Houston

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FB-468

FOR WHITENING OR TINTING RUBBER PRODUCTS

● Unaffected by either the heat of compounding or the compounding ingredients of rubber or synthetics . . . insoluble in water, dilute acids, alkalis and organic compounds . . . immune to ordinary gases . . . and light-stable — these are the properties that establish TITANOX pigments as the prime source of tinting strength for white or tinted rubber.

Fine particle size contributes to the high tinting strength of TITANOX pigments — makes them readily dispersible in the usual compounding equipment. While used primarily for whitening, brightening and controlling translucency and opacity, TITANOX pigments may also contribute to the physical strength of the product.

Whether you produce heavily or lightly loaded stocks there is a TITANOX product developed to meet your need. What's more, our Technical Service Department stands ready at any time to assist you in getting the most out of your TITANOX supplies. Titanium Pigment Corporation, 111 Broadway, New York 6, N. Y.; Boston 6; Chicago 3; Cleveland 15; Los Angeles 22; Philadelphia 3; Pittsburgh 12; Portland 9, Ore.; San Francisco 7. In Canada: Canadian Titanium Pigments, Ltd., Montreal 2; Toronto 1.

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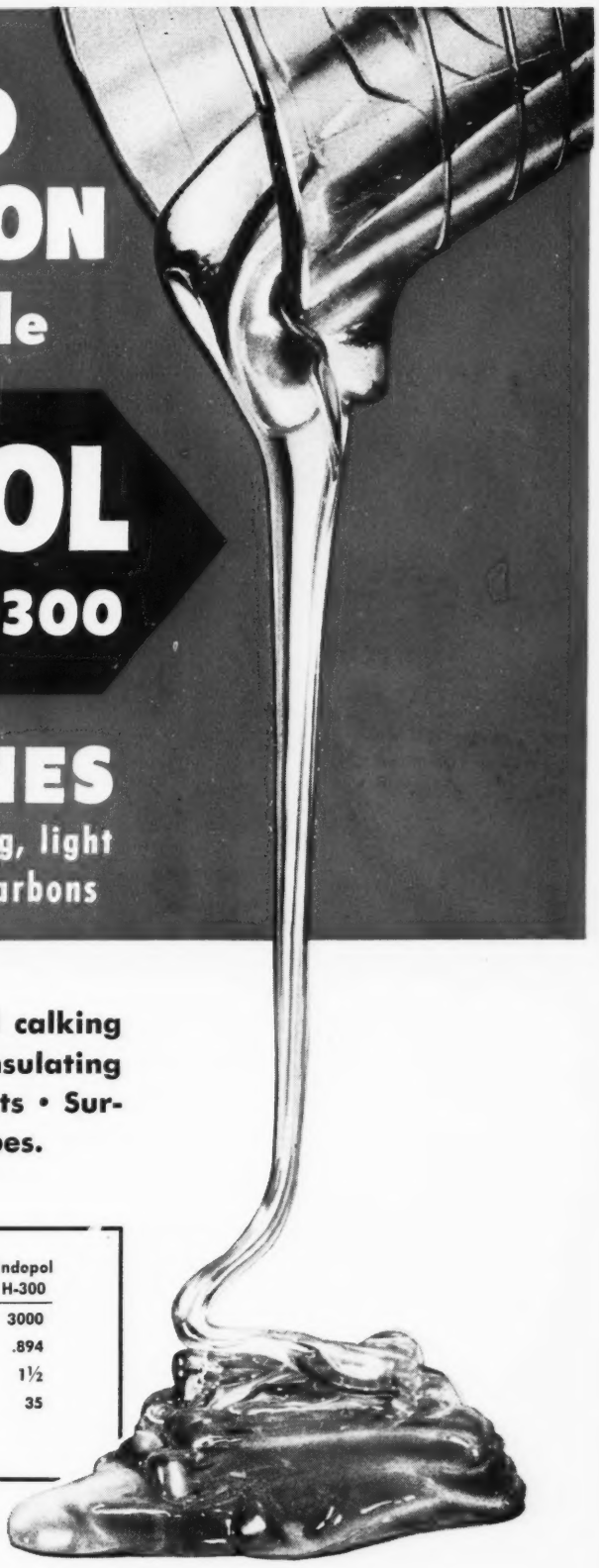
POLYBUTENES
Highly viscous, non-drying, light colored synthetic hydrocarbons



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	Indopol H-100	Indopol H-300
Viscosity 210° F., Saybolt sec.	1040	3000
Specific gravity 60°/60° F.	.881	.894
Color, NPA	1	1½
Pour Point (ASTM) °F.	20	35

Additional lower viscosity grades are available.

INDOIL® CHEMICAL PRODUCTS

INDOIL CHEMICAL COMPANY

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TRADE MARK
RUBBER PRODUCTS THE SNIFF THAT SELLS!

Customer appeal comes naturally to rubber products when you use "Alamask" odorants... "Alamask" makes that important difference, the *sniff that sells!*

Here are just a few successful end uses of "Alamask" odorants:

Rug underlays: "Alamask" ND, "Alamask" AO

Foamed sponge pillow and mattress stock: "Alamask" O, "Alamask" OS

Shoe adhesives, from natural or synthetic latices: "Alamask" ND, "Alamask" BG, "Alamask" AF

Rug backings: "Alamask" LD, "Alamask" ND

Natural smoked sheet: "Alamask" O

And this is just a part of the information contained in our booklet... "Odorants for the Rubber Industry." Send for your copy today... or let us give you our recommendation for your individual problems. Write E. I. du Pont de Nemours & Co. (Inc.), Organic Chemicals Department, Aromatics Section, Wilmington 98, Delaware. Branch Offices: Atlanta, Boston, Charlotte, Chicago, New York, Philadelphia, Providence, San Francisco.

Du Pont **Alamask** odorants
TRADE MARK

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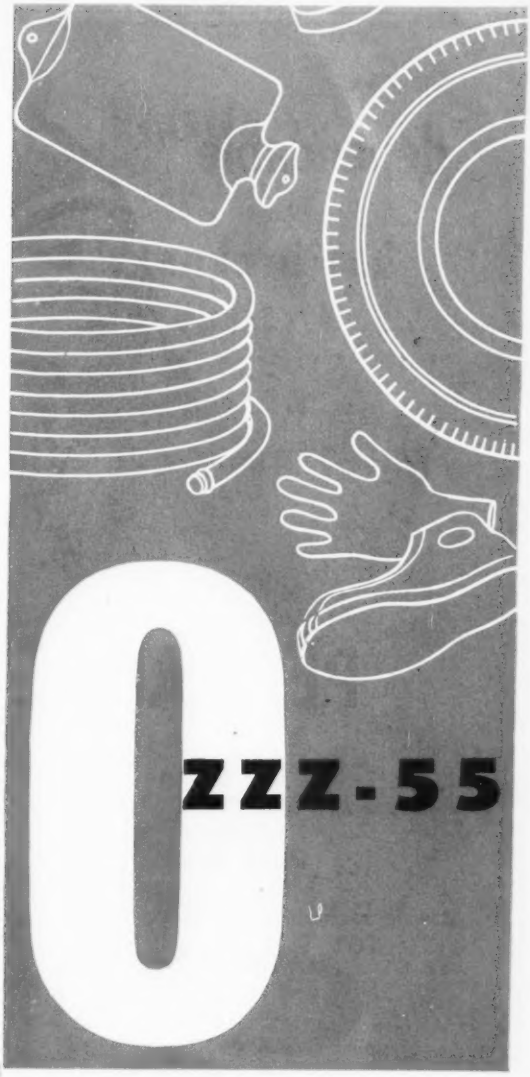
AZO-ZZZ-55

zinc oxide

An easy processing zinc oxide. Uniform particle size and absence of extreme "fines" assures good dispersion in rubber.



AZO

zinc oxides for every rubber need

AMERICAN ZINC SALES CO.

Distributors For

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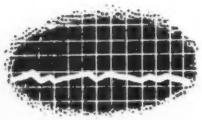
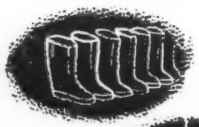
dependable

PEQUANOC reclaimed rubber

. . . has been used by experienced rubber compounders for half a century—



. . . to minimize price fluctuations in compounding costs



. . . to achieve more uniformity in processing, curing, and quality

. . . to get faster and better mixing at lower cost

. . . to make sure of a dependable domestic source of rubber hydrocarbons.

Periodic shortages and high prices of raw rubber do not worry manufacturers that have always depended on **PEQUANOC** reclaims

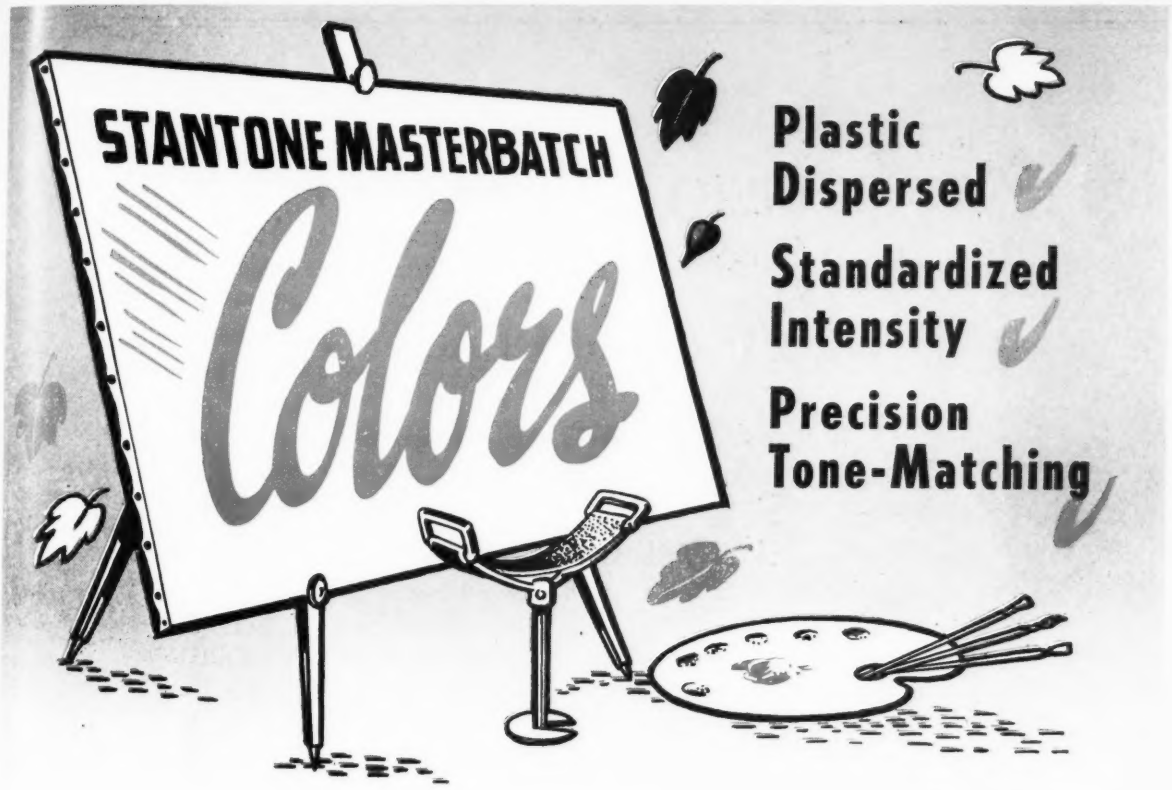
PEQUANOC

Rubber Company

BUTLER, NEW JERSEY

QUALITY RECLAIMS FOR OVER HALF A CENTURY

Manufacturers of Reclaimed Rubber



• STANTONE MASTERBATCH Colors are emulsion-dispersed in plastic, precipitated and standardized in color intensity . . . Color compounding is simply a matter of mathematical accuracy when particular shades are to be matched, or when special colors are desired. With STANTONE MASTERBATCH COLORS mills may be changed from one color mix to another without intermediate cleaning . . . Here's vital time-saving for many manufacturers that makes a valuable showing on production-cost records . . . Yes, ease of handling, color accuracy and saving in mill-room time all contribute to SAVING with STANTONE MASTERBATCH COLORS.

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DRY POWDER FORM — for general compounding use.

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PULP FORM — for latex coloring.

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PLASTICIZER-DISPERSED FORM — for organosol and plastisol vinyl resins.

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INK FORM — for printing on rubber and plastic.

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. . . Also color dispersions in polyethylene and other resins.

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Volume I has over 800 pages of editorial content with authoritative descriptions for each machine classification: Types, Specifications, Design Features, Operation, and Applications, as well as names and addresses of the manufacturers or suppliers. More than 300 illustrations. Cloth-bound for permanence.

A limited amount of advertising is being accepted for Volume 1. Send for complete prospectus and advertising rates.

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Volume II — Supplementary Machinery and Equipment, is now in preparation and will be published in the near future.

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Triple Victory

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IONOL, too, is a determined fighter of three tough aggressors—oxidation . . . staining . . . discoloration of quality rubber products. This tri-substituted hindered phenol retains its effectiveness through long exposure to light, air and heat . . . even when copper salts are present. Because of its triple action against oxidation, IONOL contributes longer life and better performance to rubber products.

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give you the PHYSICAL CHARACTERISTICS on rubber, wire, textiles, plastics—0 to 2,000 lbs.

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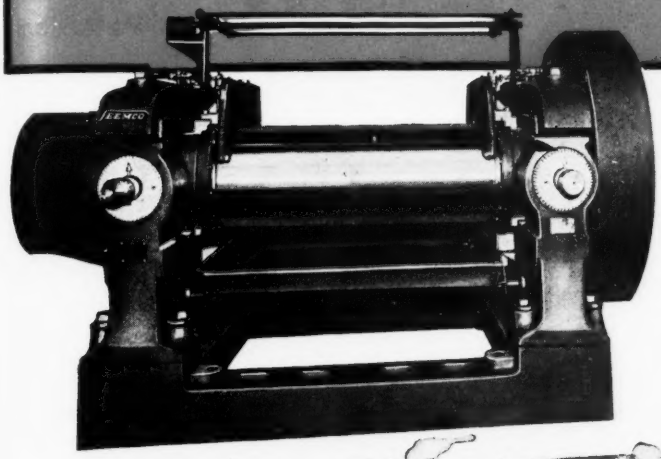

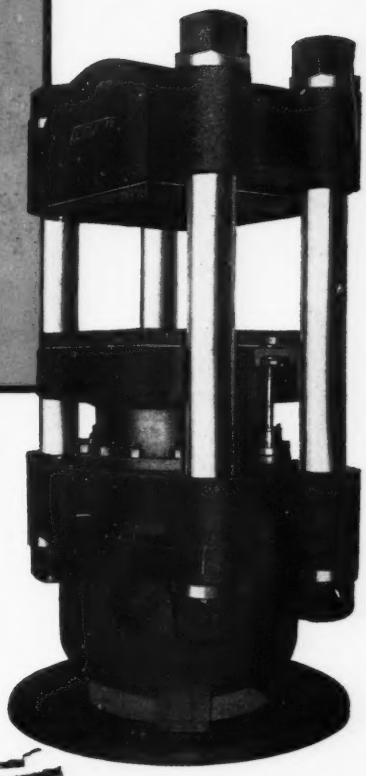

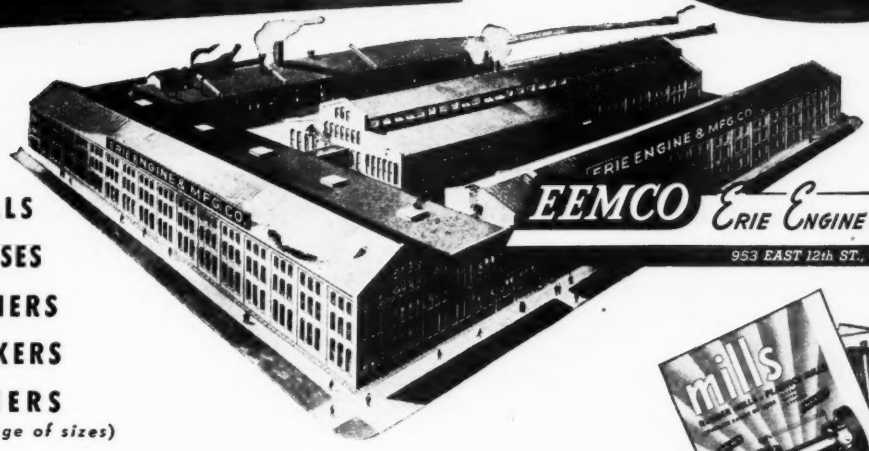

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REFINERS
CRACKERS
WASHERS
(Complete range of sizes)

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953 EAST 12th ST., ERIE, PENNA.

In this large modern factory rubber and plastics machinery has been built for the past 35 years. With installations throughout the world, EEMCO mills and presses are built for long life and heavy duty and are made by expert craftsmen to give unexcelled performance. EEMCO has its own Foundry, Machine Shop, Engineering Department, and Assembly Floor to insure fast delivery. Before you buy, get price and delivery dates from EEMCO.

Send for latest mill and press folders. Compare price, performance and shipment of EEMCO rubber and plastics processing machinery before you buy.

EEMCO *Erie Engine & Mfg. Co.*
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A LOW COST BUNA N PLASTICIZER

Excellent for LIGHT COLORED PRODUCTS

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REFRACTIVE INDEX	1.553
DISTILLATION, °F	560-730
ODOR	Excellent
VISCOSITY, SSU @ 100°F	240

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This hydrocarbon plasticizer *completely* replaces dibutyl phthalate in nitrile rubbers—produces soft vulcanizates having high tensile, excellent elongation, and very low modulus. **PANAFLEX BN-1** plasticized stocks possess good ageing properties, superior electrical characteristics, and show good gasoline and oil resistance.

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★ Uniform Caliper
★ Tightly Filled
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Three standard qualities, 20 and 40 inch widths, 100 and 250 yard rolls. Special size rolls to order — write for samples.

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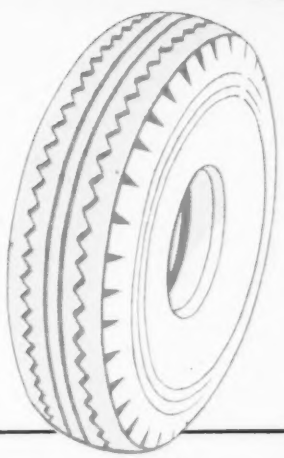

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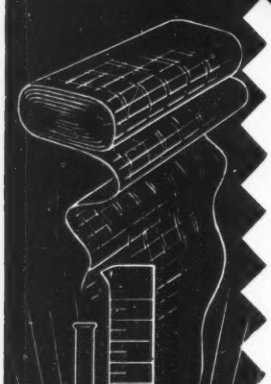

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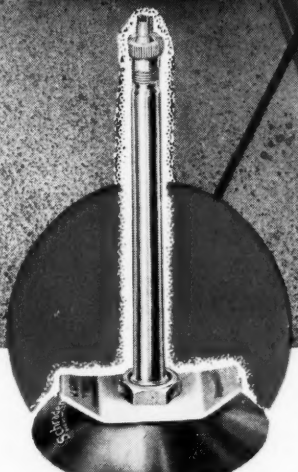

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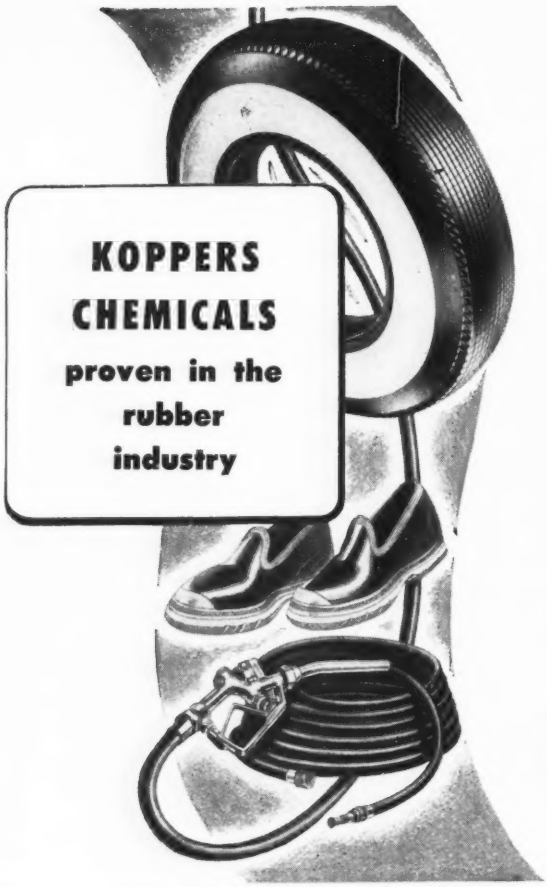

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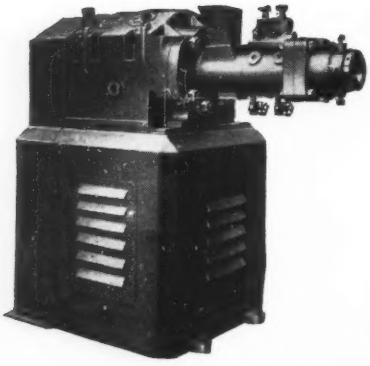

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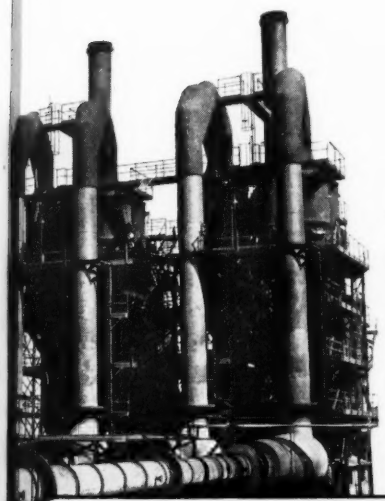

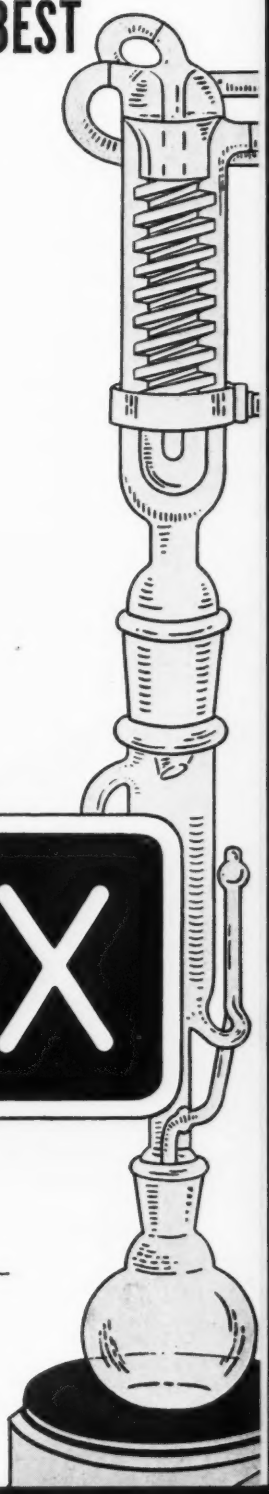

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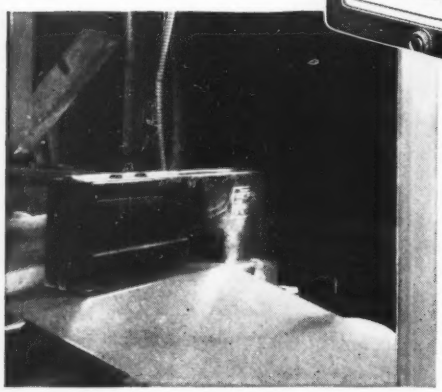

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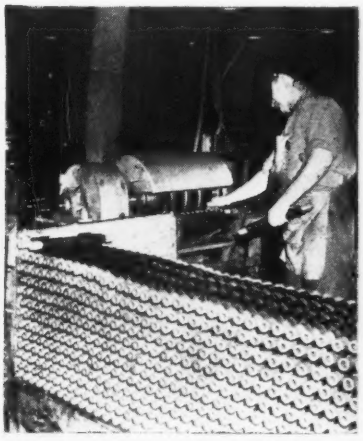
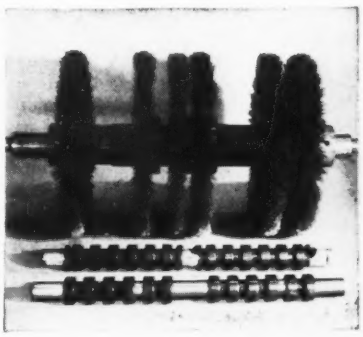
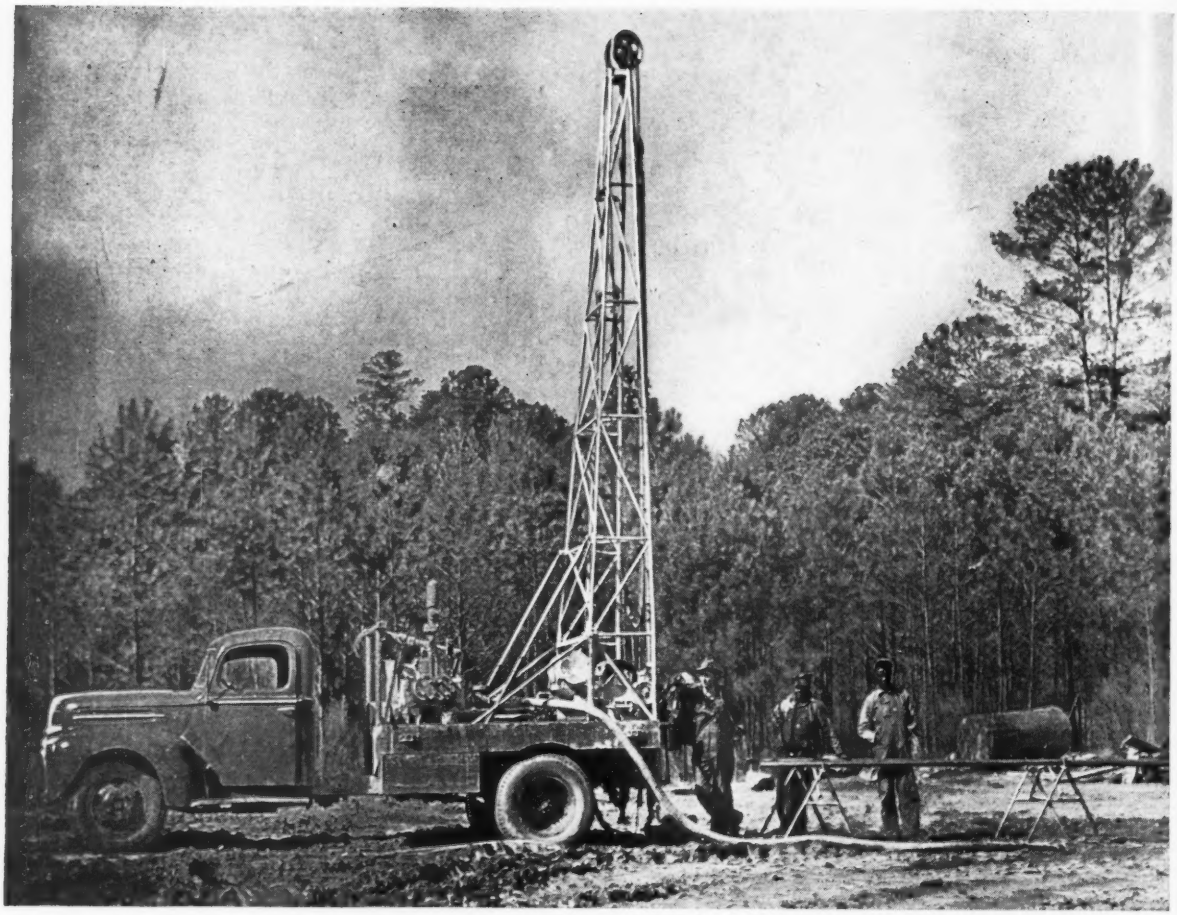


THE BRUSHING MACHINE. Molded track pins are fed in one at a time. An Osborn Disc-Center Wire Wheel Brush meshes with each of six sections where flash and film are to be removed. Areas are cleaned thoroughly in a few seconds and pin is discharged.



THE BRUSH SET-UP. This photo shows construction of arbor with six Osborn Brushes spaced to fit into track pin grooves where rubber is to be removed. In the foreground are track pins before and after brushing.



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Vol. 125—No. 1

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Some Effects of Glass Fiber on Foamed Latices[1]

Bailey Bennett[2] and G. H. McFadden[2]

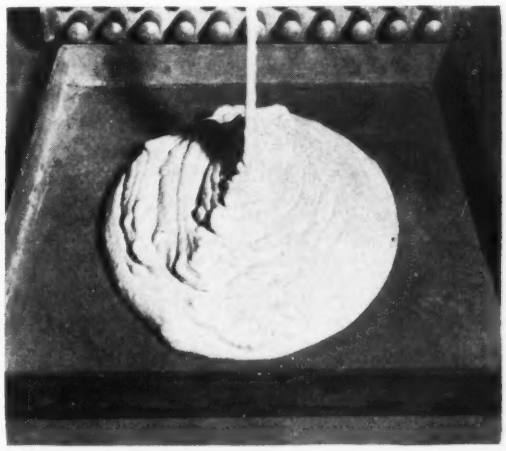


Fig. 1. A Fully Compounded 70/30 Natural/GR-S Rubber Foam Loaded with 10% Glass Fiber Based on Rubber Solids. Despite the High Glass Content the Mix Is Easily Poured

A PREVIOUS paper[3] described the use of hammer-milled glass fiber as a reinforcing material for foamed rubber latices and products made from such reinforced latices. Test results showing significant enhancement of certain physical properties of foam rubber products with glass fiber reinforcement were presented. Among the physical properties of practical interest are reduced shrinkage during processing, increased resistance to compression, and increased tensile strength. It was pointed out that the characteristics of foams are changed somewhat through incorporation of glass fiber. The purpose of the present paper is to discuss some of the effects of glass fiber on foamed latices, particularly on the gelation characteristics of such foams.

Incorporation of glass fiber in foamed latices invariably brings about some thickening of the foams. While the degree of thickening varies greatly with different recipes, for a given recipe, thickening becomes progressively greater with increased glass content. In general, however, moderate loading with glass fiber is possible without great enough thickening effects to interfere with pouring the foam into molds. Figure 1 shows a typical 70/30 natural/GR-S rubber foam, fully compounded and loaded with 1/8-inch glass fiber at 10% based on rubber solids. In spite of the rather high glass content this mix is easily poured. Addition of glass fiber, in some cases, actually aids in stabilization of the foam.

Gelation

Addition of glass fiber to a fully compounded, foamed rubber latex exerts a very pronounced influence on its gelling characteristics. Incorporation of approximately 1% glass fiber ordinarily produces a sharp reduction in gelation time, if other factors are held constant. Further increase in glass content produces a progressively shorter gelation time, although at a slower rate than that produced by the initial addition. Observations of hundreds of mixes containing glass fiber have shown this effect to be a general one, holding for many different recipes and for different latices.

The effect of glass fiber content on gelation characteristics of three different foam recipes is shown in Figure 2. The data for curve A were obtained from a 70/30 natural/GR-S rubber foam recipe, for curve B from a similar recipe, but utilizing a different type of GR-S latex, and for curve C from a neoprene foam rubber recipe.

The foams were prepared by a conventional whipping process, using a Hobart mixer equipped with a wire ship-type beater. The calculated quantity of dry 1/8-inch glass fiber was added after the compounded latices had been partially whipped. The whipping was continued until an expansion of 700% had been reached. At this point a 40% dispersion of sodium fluosilicate was added and dispersed by a few seconds' continued whipping. Gelation times were recorded as the time intervals from the instant of addition of the gelling agent (sodium fluosilicate) until formation of firm gels. For a given recipe the amount of gelling agent used as well as the latex temperatures was kept constant during each experiment. The only known variable was the percentage of glass calculated on dry rubber content. The operating

[1] A joint contribution of the Inland Mfg. Division of General Motors Corp. and the Ohio State University Research Foundation.

[2] Department of Agricultural Biochemistry, Ohio State University, Columbus 10, O.

[3] Bennett, McFadden, Lyman, India RUBBER WORLD, 122, 6, 672 (1950).

temperature for data in curve B was 70° F.; for the other two curves the temperature was 68° F.

Effect of Starch Binder

One of the 70/30 natural/GR-S rubber recipes (curve A in Figure 2) was selected for further study of the manner in which reduction of gelation time is brought about by incorporation of glass fiber. The first approach to this problem was to determine the effect of the starch binder known to be present as a surface coating on the glass used. The ⅛-inch glass fiber used in the work reported here was cut to length by hammer-milling continuously drawn glass fiber. At one stage in the production of such drawn glass fiber it is lightly coated with a binder. Starch is the principal ingredient of a commonly used binder.

A quantity of the fiber was subjected to a heat cleaning treatment designed to remove all traces of binder present. It was found that heating the fiber in a muffle furnace for about an hour at 1095° F. would accomplish the desired result.

The test used to show the presence of starch follows. A small amount of the fiber to be tested is thoroughly dispersed in an excess of 10% potassium iodide solution. Then a few drops of 3% hydrogen peroxide are added to the mixture, which liberates free iodine. The glass fiber is collected on a suction filter. A violet starch iodide color shows if the glass is not completely free of starch binder; heat cleaned glass shows no such color.

The gelation experiments, data for which are shown in curve A of Figure 2 were repeated under similar conditions except that this time (curve B, Figure 3) heat cleaned glass fiber was used. The results were similar to those obtained when glass fiber covered with starch binder was used; the heat cleaned glass fiber, however, reduced gelation time at a faster rate. In each case there is an initial sharp drop in gelation time followed by progressively reduced gelation times with increased glass content, which indicates that the general effects observed are associated primarily with the glass itself. Presence of the starch binder merely slows the rate of gelation.

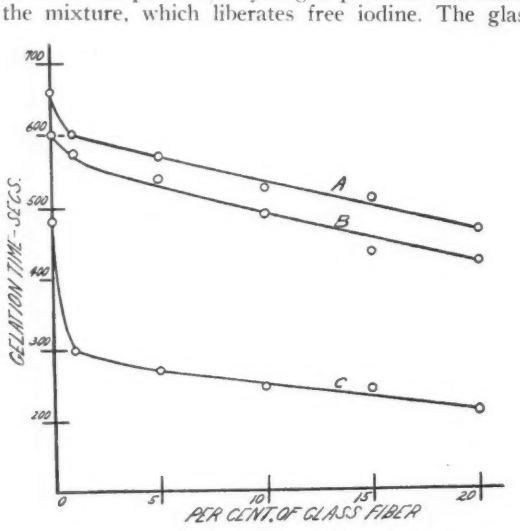


Fig. 2. Effect of Glass Fiber Content on Gelation Time of Foamed Rubber Latex, Whipped to Constant Percentage Expansion. Curves A an B Are 70/30 Natural/GR-S Rubber Recipes; Curve C Is a Neoprene Foam Rubber Recipe

Mechanism of Gelation Time Reduction

In view of the major role pH plays in the gelation of latices,[4] several experiments were conducted in order to find the effect of glass content on the pH of foamed rubber latices. Most of this work was done utilizing the same 70/30 natural/GR-S rubber recipe used in in the study of the effects of starch binder. The glass used here was not heat cleaned. The procedure was similar except that in the pH studies compounded latices were whipped during constant time intervals, since time intervals could be controlled more accurately than percentage of expansion. The pH measurements were made with a glass electrode.

These studies showed a gradual drop in the pH of foams with increased glass content; the pH reached a minimum at some point near 10% glass content. The pH values began to rise again with higher glass content. A typical pH curve is shown in Figure 4. Operating temperature for the data presented here was held constant at 69° F.

In order to correlate pH data with gelation times a number of gelation experiments were conducted in which the compounded latices were whipped during constant time intervals rather than to constant percentage expansion. Figure 5 is such a curve obtained at 70° F. with the 70/30 natural/GR-S rubber recipe used for the pH data shown in Figure 4. The form of this curve closely parallels the pH curve, showing a reduction in gelation time with increased glass content, which reaches a minimum at about 10% glass and then gradually rises again. These studies suggest that the mechanism of gelation time reduction caused by incorporation of glass fiber involves largely pH changes brought about by reaction of the glass with the latex mix. This statement is not too surprising since finely divided glass is partially soluble in a variety of substances. The pH changes noted above are apparently a direct result of leaching of the

(*Continued on page 60*)

[4] Livingston and Walsh, *Ind Eng. Chem.*, 38, 12, 1262 (1946). Murphy, Madge, and Pounder, India RUBBER WORLD, 119, 6, 720 (1949).

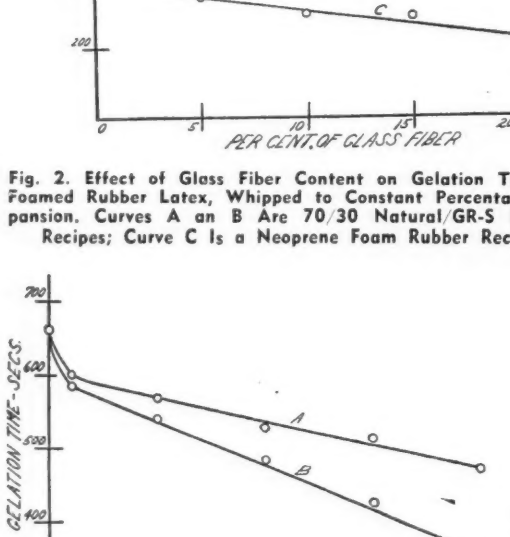


Fig. 3. Effect of Starch Binder on Glass Fiber on Gelation Time of Foamed Rubber Latices. Curve A is for Latex Containing Glass Fiber on Its Surface; Curve B is for Latex Containing Glass Fiber Which Has Had the Starch Binder Removed by Heat Treatment

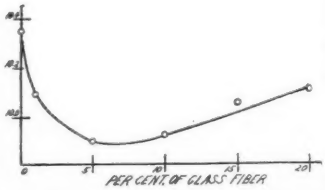


Fig. 4 Effect of Glass Fiber Content on the pH of Foamed Rubber Latex

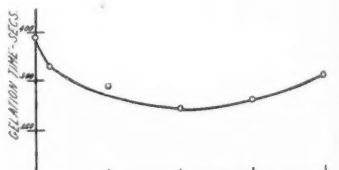


Fig. 5. Effect of Glass Fiber Content on the Gelation Time of Foamed Rubber Latex Whipped during Constant Time Intervals

Storage Stability of Unvulcanized Natural, Nitrile, and GR-S Rubber Compounds

Charles H. Schroeder[1]

THE storage stability of compounded, but unvulcanized stocks is of great importance to the manufacturer of rubber products. Supplies of compounded stocks, from which withdrawals may be made at irregular intervals for processing and curing to fill orders for finished products, should have the ability to remain plastic for several months. It should be possible also for stocks to be mixed in one plant and shipped to another plant or to a given company's repair crews in the field even in the hottest weather without excessive hardening or loss of plasticity being experienced by these stocks. Good storage stability is also essential for such items as tire repair materials which are sold in an uncured state for vulcanization at a later date.

Factors which affect the storage stability of unvulcanized natural and synthetic rubber stocks are discussed. They are the effect of different vulcanization accelerators, and retarders and the heat history of the compound; the effect of polymers of different types and of different lots of the same type; and the effect of the reaction between the polymer and the loading pigment.

It has been observed that the loss of plasticity of a given stock, after aging at 110° F. for varying periods of time, gives a good indication of its relative storage stability. This type of information may also be used to predict factory processing characteristics of a stock after storage at room temperature.

Experimental Details

The Goodrich plastometer[2] may be used to obtain data for the study of loss of plasticity of rubber stocks. Although a variety of weights and testing temperatures has been employed with this instrument, for this work a five-pound weight and a temperature of 70° C. were used. Unless otherwise noted, all data on plasticity in this paper have been obtained under the above conditions.

Results and Discussion

It is generally recognized that the selection of the type of accelerator to be used in a given compound is of very great importance in obtaining good storage stability. This fact is illustrated by the data reported below:

EFFECT OF ACCELERATOR TYPE ON COMPOUND STORAGE STABILITY

Ingredients	Compound A	Compound B
Nitrile rubber	100.00	100.00
Sulfur	2.00	2.00
SRF black	100.00	100.00
Ester-type plasticizer	30.00	30.00
Age resister	.50	.50
Resin-type plasticizer	10.00	10.00
Zinc oxide	4.00	4.00
Benzothiazyl disulfide	1.50	.....
Mercaptobenzothiazole	.....	1.00
Plasticity, original	58.9	67.00
Aged 2 weeks @ 110° F.	49.1	8.10

Stocks may be damaged by exposure to too high temperatures for too long periods of time and therefore may give evidence of poor storage stability. Good storage stability, as indicated by recovery of plasticity, can frequently be regained, if the stocks have not been too badly scorched, by remilling with retarders. The data in the following table illustrate this point for a lot of molding compound which was deliberately damaged by hot milling and subsequently recovered by remilling the damaged stock with a retarder.

EFFECT OF RETARDER ON PLASTICITY OF SCORCHED STOCK

	Fresh Compound	After Hot Milling	Remilled with Retarder
Plasticity, original	82.9	82.3	86.3
Aged 2 weeks @ 110° F.	81.9	2.3	82.6

No one retarder appears to be effective in all formulations. Malic acid is outstanding with nitrile rubbers, but does not appear to work so well with GR-S or natural rubber. Whether this phenomenon is due to the type of polymer or to the accelerator combination used in a given case, or both, cannot be conclusively stated. For most GR-S, nitrile, and natural rubber formulations, however, an effective retarder can usually be found. Goodrite Vultrol, trichloromelamine, and Retarder W are suggested for any work with heat-damaged stocks.

Stocks damaged by excessive heat do not appear to regain storage stability when diluated with non-curing masterbatches. It has been observed that the practice of working away a heat-damaged stock in a fresh compound results in seriously impairing the storage stability of the mixture.

Effect of Polymer Characteristics on Storage Stability

The relation between the characteristics of various types of polymers or, in this instance, the characteristics of two different lots of 75-25 butadiene-acrylonitrile synthetic rubber prepared using different polymerization techniques, is illustrated by the following data. Considerably different storage stabilities were evidenced when the two lots were compounded in identical recipes.

EFFECT OF POLYMER CHARACTERISTICS ON STORAGE STABILITY

Ingredients	Lot A	Lot B
Nitrile rubber	100.00	100.00
SRF black	85.00	85.00
Ester plasticizer	30.00	30.00
Resin plasticizer	10.00	10.00
Zinc oxide	5.00	5.00
Tetramethyl thiuram disulfide	.10	.10
Benzolthiazyl disulfide	1.50	1.50
Sulfur	2.00	2.00
Plasticity, original	55	52
Aged 4 weeks @ 110° F.	27	5.6
Mooney scorch, lg. rotor @ 300° F.		
Scorch time plus interval to reach 20 points above minimum	6	6½

[1] Industrial products division, B. F. Goodrich Co., Akron, O.
[2] *Ind. Eng. Chem.* (Anal. Ed.), *2*, 96 (1930).

These data clearly indicate that loss of plasticity was due to an inherent characteristic of one lot of this polymer and was not dependent on the rate of cure of the batch. The Mooney scorch results show that the material exhibiting poor storage stability had a slightly slower rate of cure. The result in this instance was the opposite to that which would have been encountered if the rate of cure alone had been the cause of poor storage stability. Confirming data have been obtained using similar batches compounded with neither sulfur nor accelerator.

Unfortunately, no retarder or stabilizer in general use will overcome the inherent shortcomings of improperly prepared synthetic rubber. Also, certain commercially available types of American synthetic rubber exhibit poor storage stability. Therefore the basic characteristics of a polymer should be investigated when poor storage stability is encountered.

Effect of Interaction between Elastomer and Loading Pigment

The loss of plasticity on storage of uncured compounds which is caused by the interaction of the elastomer and loading pigment is a complex phenomenon. At least five factors are involved: (1) type of loading pigment; (2) quantity of pigment incorporated; (3) source of supply of the pigment; (4) mixing conditions employed; (5) temperature at which the batch is stored.

Certain loading pigments are known to alter the rate of cure. Since it has been shown earlier that rate of cure influences storage stability, the study of elastomer-pigment interaction must be made using formulations containing neither sulfur nor accelerator.

The following data show loading pigments vary in their effect on plasticity of the compound in storage.

Effect of Loading Pigments on Compound Storage Stability

Ingredients	Compound A	Compound B
GR-S	100.00	100.00
Zinc oxide	2.00	2.00
HAF black	50.00	.....
SRF black	.....	85.00
Light process oil	18.00	18.00
Plasticity, original	55	58
Aged 4 weeks @ 110° F.	34	53

In general, most non-black pigments behave like SRF black, although certain types of whiting and large quantities of zinc oxide (250 phr) behave like HAF black in their effect on compound storage stability. Among the carbon blacks, those with the smaller particle size (such as MPC black) impart poor storage stability to rubber compounds.

The loss of plasticity caused by HAF black is not confined to GR-S formulations. Nitrile and natural rubber compounds show similar loss of stability on storage.

That the loss of plasticity during storage is a function of the amount of pigment incorporated in the compound is shown by the following data.

Effect of Increased Black Loading on Compound Storage Stability

Parts of HAF black per 100 parts of N rubber	20	30	40	50	60
Plasticity, original	77	67	62	59	50
Aged 4 weeks @ 110° F.	75	64	50	34	20

There appears to be a significant difference in the plasticity loss during storage of compounds made with HAF blacks from different suppliers. The data in the table below were obtained using 50 parts of HAF black per 100 parts of rubber in a non-curing formulation.

Effect of HAF Blacks of Various Suppliers on Compound Storage Stability

HAF Black	A	B	C	D	E
Plasticity, original	39	23	25	26	38
Aged 2 weeks @ 110° F.	30	14	24	15	36

These results are not isolated data, but are representative of more than one test. The amount of variation between shipments from one supplier, however, has not as yet been determined conclusively. It cannot be stated definitely, therefore, that one type of HAF black will invariably perform better than another with respect to uncured storage stability. Although the above results were obtained using GR-S, these blacks perform similarly in nitrile rubber formulations.

Conditions of mixing influence the storage stability of compounds in an unexpected manner. Batches mixed as cool as possible, become harder (less plastic) during storage than those mixed hot. Even under conditions of mixing which cause the hot mixed material to be originally less plastic than the cold mixed compound, this relation appears to hold true.

The following data illustrative of this point were obtained using nitrile rubber. Similar results have been found for equivalent GR-S formulations.

Effect of Mixing Temperature on Compound Storage Stability

Ingredients	Mixed Cool	Mixed in Internal Mixer at 260° F. for 5 Min.
Nitrile rubber	100.00	100.00
Zinc oxide	4.00	4.00
Ester plasticizer	35.00	35.00
Resin plasticizer	10.00	10.00
HAF black	65.00	65.00
Plasticity, original	62.6	43.3
Aged 4 weeks @ 110° F.	21.8	39.3

The temperature on storage also has its effect on the amount of plasticity lost by a given compound. The higher the storage temperature, the greater the loss of plasticity experienced. Although the data are not conclusive, it appears that the coefficient of plasticity loss with increasing temperature is not constant, but may vary with the composition of the material involved. The data presented below are typical of the loss of plasticity of compounds exposed to increasing temperatures of storage.

Effect of Temperature on Compound Storage Stability

	Plasticity		
Temperature, ° F.	110	130	158
As prepared	61.4	61.4	61.4
After 3 weeks	34.2	20.6	10.6

Loss of plasticity under these conditions does not appear controllable by the use of retarders or chemical peptizers such as RPA.

Summary and Conclusions

Loss of plasticity due to interaction of polymer and loading pigment and aging can be overcome by remilling and therefore is not serious in formulating compounds which can be remilled before use. Compounds which are sold in the unvulcanized state and cannot be remilled after aging and before use must be formulated so as to avoid loss of plasticity due to polymer and pigment interaction or from other cause shown in this paper.

The factors influencing the storage stability of unvulcanized compounds both with and without curing agents have been discussed, and it has been shown that by proper formulation it is possible to produce stocks with adequate uncured storage stability.

"Petrocarbon Services." Petrocarbon, Ltd., 170 Piccadilly, London W.1, England. 17 pages. An outline of the company's activities appears in this illustrated booklet. Operations covered include research, development, planning, process design, fabrication and construction, plant running-in, and plant operation.

A Study of the Factors Affecting the Weathering of Rubber-Like Materials—II

Earl W. Ford[1] and L. V. Cooper[2]

THE details of the ozone, light, temperature, and humidity formation and controlling parts for the new Firestone weathering apparatus and some results of the use of this apparatus for determining the effects of these factors, either alone or in combination, on rubber-like materials are given in this second and concluding installment of the article begun in our September issue.

Description of Auxiliary Equipment

In addition to the test chamber described in Part I, four auxiliary units were also developed.

Ozone Control

The most difficult design problem involved in the auxiliary equipment was the mechanism for controlling ozone concentration. Because of the low ozone concentrations at which it was desired to work, ca. 5-50 parts of ozone per hundred million parts of air, the length of path necessary for measurement and subsequent control by means of the absorption of ultra-violet light is prohibitively long. After a study of the ozone measuring devices developed by Edgar and Paneth and the system used by Crabtree and Kemp a combination and modification of their methods was developed which made it possible to control ozone concentration continuously.

First, a test cell similar to the one described by Crabtree and Kemp[3] was constructed. To this cell two items were added, a pair of electrodes and a float con-

[1]Chemical and physical research laboratories, Firestone Tire & Rubber Co., Akron, O.

[2]Physical testing division, Firestone Tire & Rubber Co.

[3]"Weathering of Soft Vulcanized Rubber." *Ind. Eng. Chem.*, 38, 278 (1946).

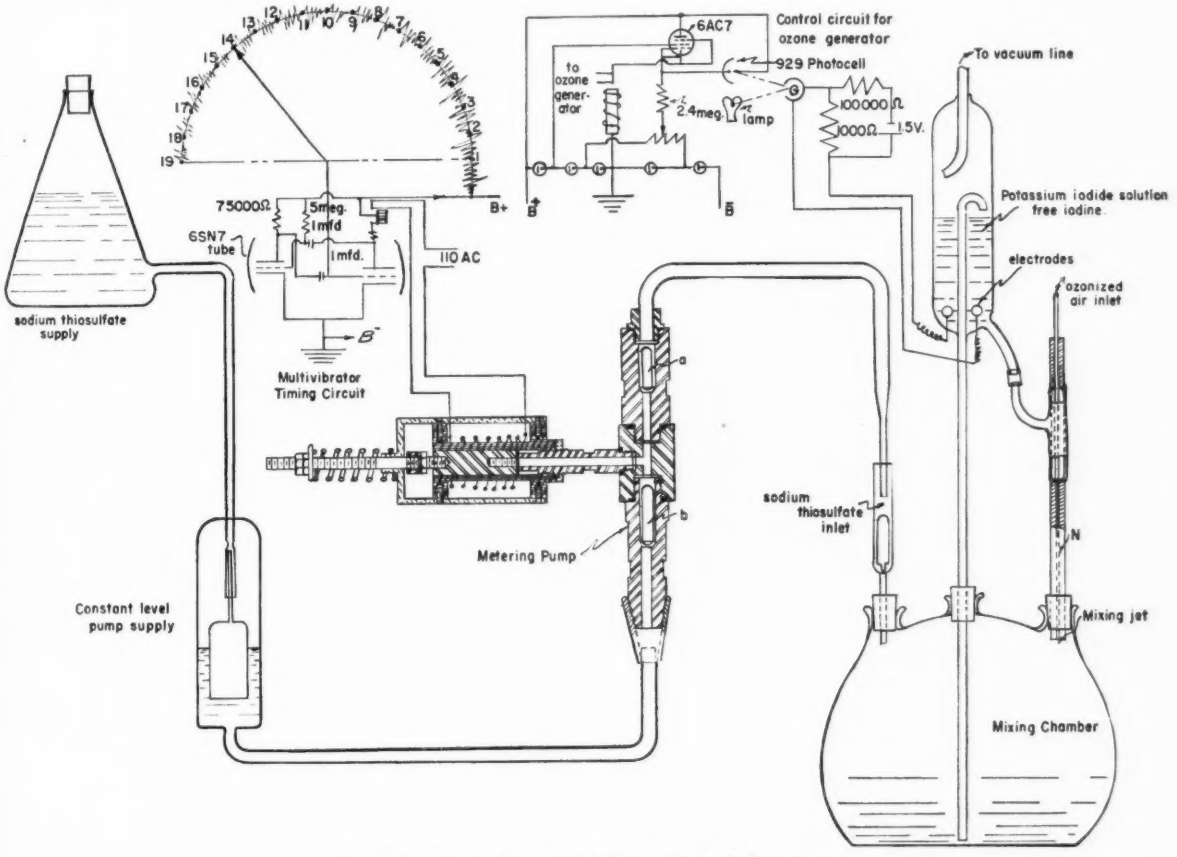


Fig. 3. Schematic Diagram of Ozone Control Apparatus

trolled valve to permit injection of thiosulfate into a test cell containing a solution of sodium thiosulfate. Figure 3 shows the essential details of the apparatus. The electrodes are connected in series with a 15-millivolt source and a Leeds & Northrup galvanometer, No. 2420C. A Type 929 RCA phototube is mounted in the center of the galvanometer scale so that when the galvanometer is not deflected, the photocell is illuminated by the light reflected from the galvanometer mirror when the galvanometer shows zero deflection, and the photocell activates a relay to supply power to the ozone generator. (The ozone is generated by electrical discharge.) As the ozonized air is aspirated (at a controlled rate) through the system, it reacts with the potassium iodide liberating free iodine. Since the conductivity of potasasium iodide solution containing free iodine increases rapidly with the amount of free iodine present, this conductivity permits a current to flow between the electrodes, which causes the galvanometer to deflect and turn the ozone generator off.

In order to control the ozone cencentration it is necessary to titrate the iodine at a predetermined rate. To accomplish suitable injection of the thiosulfate solution, a stainless steel pump, shown in Figure 3, whose plunger is actuated by a solenoid, was designed and built. The glass check valves at "a" and "b" insure operation of the pump at a constant volume per stroke. Means were also provided for adjusting the stroke and hence the volume of liquid delivered per stroke. The solenoid driving the pump is energized by a relay in one arm of the multivibrator circuit. The oscillation rate of the multivibrator circuit is controlled by changing the resistance in one grid circuit. The quantity of .001 N thiosulfate required per second to maintain an ozone concentration over the range of 0.05 to 0.45 ppm of ozone was determined. The delivery volume of the pump and the pumping rates were empirically determined. The volume of thiosulfate delivered per stroke was arbitrarily chosen as 0.029 cm^3/stroke and the timing of the multivibrator adjusted to give the proper number of strokes per minute. Table 1 shows the ozone concentration as a function of the cycling time of the multivibrator circuit. To obtain higher ranges of ozone concentration it is only necessary to use thiosulfate solutions of higher normalities.

TABLE 1. CONSTANTS FOR OZONE CONCENTRATION CONTROL PUMP

Air flow-rate 30 ft^3/hr.
Delivery volume per stroke 0.029 cm^3

Ozone Concentration Desired (Ppm)	Volume .001N Thiosulfate/Sec. $\left(\frac{Cm^3}{Sec.}\right)$	Time/Stroke (Sec./Stroke)
0.050	0.001056	27.5
0.055	0.001160	25.0
0.060	0.001264	22.9
0.065	0.001370	21.2
0.070	0.001476	19.6
0.075	0.001584	18.3
0.080	0.001685	17.2
0.085	0.001790	16.2
0.090	0.001898	15.3
0.095	0.002002	14.5
0.100	0.002112	13.7
0.125	0.002635	11.0
0.15	0.003162	9.17
0.20	0.00422	6.89
0.25	0.00527	5.52
0.30	0.00638	4.58
0.35	0.00738	3.93
0.40	0.00844	3.44
0.45	0.00948	3.06

The reaction takes place in a solution obtained by dissolving 15 grams of potassium iodide in 50 cubic centimeters of distilled water and adding 75 cubic centimeters of a buffer solution. This is made by adding 3.25 grams of potassium phosphate and 1.75 grams of sodium phosphate to two liters of boiled, distilled water.

In operation, this potassium iodide solution is inserted in the control apparatus (Figure 3), and the vacuum and electrical circuits are turned on. An automatic air flow control mechanism maintains the flow of the air sample from the test chamber through the control apparatus at a predetermined rate (selected empirically as 30 cubic feet per hour). The air sample is intimately mixed with the potassium iodide solution in the apparatus, and any ozone present reacts with the potassium iodide releasing free iodine according to the reaction.

$$2I^- + O_3 + H_2O \rightarrow \rightleftharpoons O_2 + I_2 + 2OH^-$$

Until the concentration of free iodine in the solution builds up to a sufficiently high value, the galvanometer beam remains on the photoelectric cell, and the circuit is so arranged that the ozone generator remains actuated. Since the only necessary condition for the operation of this system is that there be KI solution present with which the ozone may react, the potassium iodide solution is usable for many hours.

At the same time the multivibrator driven pump is injecting thiosulfate at the proper rate to maintain the desired ozone concentration. It is necessary, then, for the ozone generator to be set to generate ozone at a rate high enough to make the atmosphere in the test chamber richer in ozone than is desired for the test. After the apparatus is in operation for a short time, the ozone concentration builds up, and the potassium iodide solution becomes sufficiently conducting, owing to the presence of free iodine, to pass enough current to deflect the galvanometer beam off the photo-electric cell. This actuates a relay which turns the ozone generator off until the thiosulfate neutralizes enough free iodine to return the light beam to the photocell and reenergize the ozone generator. Actually the main ozone generator is so designed that it can be adjusted to generate ozone at a constant rate just below that required to maintain the desired concentration, and the photocell simply controls a booster to the generator, thereby reducing the amount of swing above and below the desired norm. In practice, the "on" and the "off" periods of the ozone generator are about 30 to 60 seconds each. The ozone concentration in the chamber with the control functioning has been calibrated thoroughly by a test apparatus identical to that described by Crabtree and Kemp.[3] The concentration measured over periods of 15, 30, or 60 minutes has consistently been found to be within 5% of the concentration at which the control was set.

Light Source

After investigation of several sources of light, the General Electric AH-6 high-pressure mercury arc lamp was chosen for incorporation in the weathering unit. The following reasons contributed to the choice of this source. (a) Cleanliness: The AH-6 lamp, being an entirely enclosed mercury arc, gives off neither soot nor combustion gases. Figure 4 shows a photograph of a single lamp and of the fixture designed to hold three of these AH-6 lamps. (b) Low amount of heat energy radiated outside the fixture: The lamps operate in a continuous flow of distilled water which absorbs approximately 90% of the heat energy. (c) High intensity over the spectral range 2000Å to 9000Å. Figure 5 shows the emission for the entire spectral range under consideration. (d) The cost of operation. The lamps are relatively inexpensive and have an average life of 75 hours. (e) They are small in size: The schematic circuit of the light source and accessories is shown in Figure 6.

It was found necessary in practice to incorporate the heat exchanger and circulating pump shown and to use distilled water because water from the city mains contained sufficient "precipitable materials" to coat the hot

surface of the quartz lamps in a short time and cause them to become poor heat conductors. When this happened, the temperature and pressure in the AH-6 lamp rose to a value sufficient to cause premature failure and consequent short tube life.

A set of Corning Glass Co. filters was secured to give the series of transmission bands shown in Figure 7. These filters could be fitted in front of the light source.

Temperature Control

The temperature control apparatus consists of the duct work, described in the discussion of the test chamber, in series with a small enclosure containing 6-500 watt coil heaters and a fan. Also included is a refrigerating cabinet employing dry ice as the refrigerant. Suitable thermo-

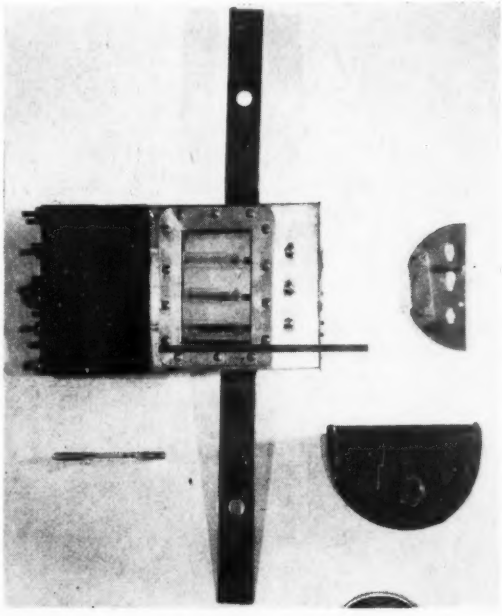


Fig. 4. Three Lamp Fixture and AH-6 Lamp

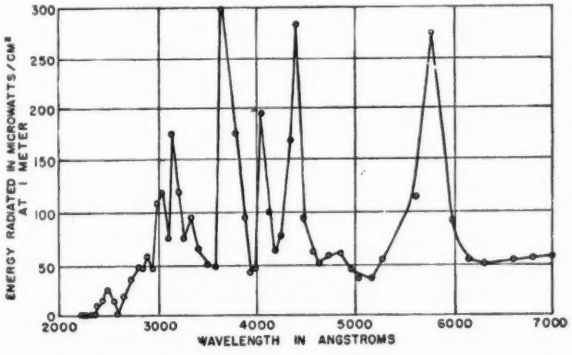


Fig. 5. Emission Spectrum of AH-6 Lamp

static controls are coupled to the heating and cooling apparatus to maintain the desired temperature to within 1° C. over the temperature range —40 to 100° C.

Humidity Control

The humidity control consists of a simple type of bulb-actuated temperature control switch of the type used on

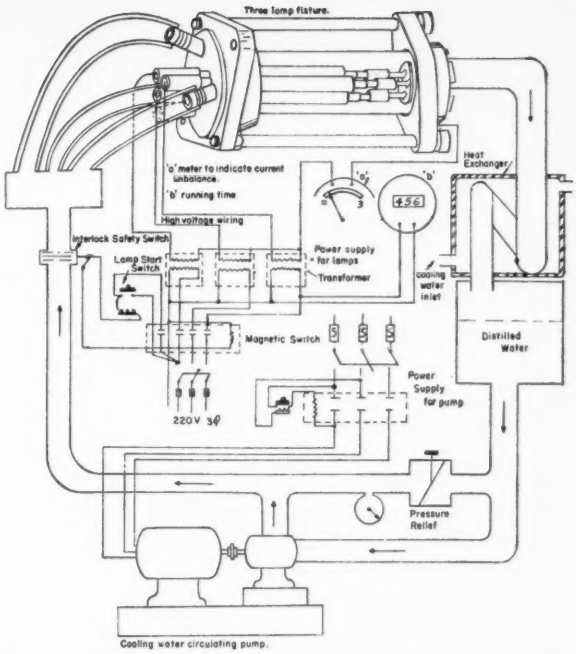


Fig. 6. Schematic Diagram of Light Source and Accessories

refrigerators. This switch actuates a valve which admits low-pressure steam into the system. The bulb of the control is surrounded by a piece of wicking of the type used with wet and dry bulb thermometers. The temperature in the cabinet is maintained constant by the heating and/or refrigerating equipment, and the wet bulb switch operates at the proper temperature to maintain the desired relative humidity.

General Summary of Performance

The above described auxiliary control systems make it possible to control each of the four variables independently. For example, if the light source tends to increase the ozone concentration, the ozone control apparatus simply reduces the output of the regular ozone generator. If the light source tends to raise the temperature of the chamber, the temperature control accommodates for the amount of heat received from the light source. The ozone generator is housed in the auxiliary apparatus cabinet and emits no light.

All pieces of auxiliary apparatus are housed in a separate cabinet, shown in Figure 8. The ozonized air from the ozone generator and the air sample by means of which control is achieved are conducted through copper tubing.

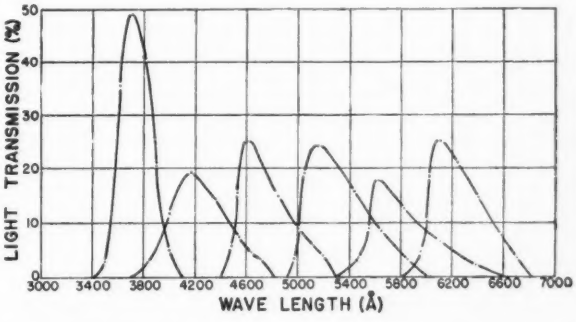


Fig. 7. Filter Combinations and Wave Length Bands Transmitted

TABLE 2. EVALUATION STOCKS USED IN TESTING PROGRAM

	Hevea Stock			GR-S Stock		GR-M Stock			GR-I Stock		
	Gum	Black	White	Gum	Black	Gum	Black	White	Gum	Black	White
Stock No.	3114	3116	3117	3118	3120	3134	3135	3136	3137	3138	3139
Optimum cure at 280° F.—min.	40	40	60	60	60	40	40	40	80	40	80
Hevea	100.0	100.0	100.0	....	....	....	....	....	....	....	....
GR-S	....	....	....	100.0	100.0	....	....	....	....	....	....
GR-M	....	....	....	....	....	100.0	100.0	100.0	....	....	....
GR-I	....	....	....	....	....	....	....	....	100.0	100.0	100.0
Stearic acid	2.0	3.0	1.2	1.0	2.4	0.5	0.5	0.5	1.0	1.0	1.0
Sulfur	3.0	2.5	3.0	2.0	2.0	....	....	....	2.0	2.0	2.0
ZnO	5.0	3.0	50.0	5.0	2.4	5.0	5.0	50.0	5.0	5.0	50.0
EPC Black	....	35.0	....	....	23.0	....	40.0	....	....	40.0	....
HMF Black	....	....	....	....	23.0	....	....	....	....	....	....
Petroleum tar softener	....	2.0	....	....	4.0	....	....	....	....	....	....
N-cyclohexyl benzothiazole-2-1 sulfenamide	....	1.0	....	1.2	1.1	....	....	....	....	....	....
MBT	0.75	....	0.8	....	....	....	....	....	0.5	0.5	0.5
Ultramarine blue	....	....	0.1	....	....	....	....	0.25	....	....	....
Titanium dioxide	....	....	50.0	....	....	....	....	20.0	....	....	....
TMTDS (Tetramethyl thiuram disulfide)	....	....	....	....	4.0	....	....	....	1.0	1.0	1.0
Coal-tar softener	....	....	....	....	....	....	....	....	....	....	....
Pip pip	....	....	....	....	....	0.25	0.25	0.25	....	....	....
Dibutyl sebacate	....	....	....	....	....	....	....	....	3.0	3.0	3.0
Medium process oil softener	....	....	....	....	....	2.0	2.0	2.0	....	....	....
MgO	....	....	....	....	....	4.0	4.0	4.0	....	....	....
	110.75	146.5	205.1	109.2	161.9	111.75	151.75	177.0	112.5	152.5	157.5

Typical Results: Stocks Used for Evaluation Purposes

For use in the preliminary evaluation of the Firestone weathering apparatus, a representative set of stocks based on the four polymers, Hevea, GR-S, GR-M, and GR-I, was compounded. A simple gum stock, a black loaded stock, and a white stock were formulated for each of the polymers, with the exception that no white stock was formulated in the case of the GR-S polymer.

Table 2 lists the compound numbers and formulae of the several stocks, together with the "optimum" cure (determined by the usual physical test methods.)

Reproducibility of Results

Table 3 shows data from a few runs, chosen for comparison of results under identical test conditions. The rating system used is based on an empirical standard and is dependent upon the experimenter's judgment. The scale depends upon the number and the size of cracks. A stock exhibiting no cracks was rated as zero, and a stock with an appreciable number of large, deep cracks would be rated as five, compared with a rating of two or three for a stock having a multitude of very fine, shallow cracks. This rating system is admittedly not very exact, but was used because the appearance of a stock is a very important criterion as to its usability. Certain of the stocks were exposed at various elongations to ozone in the regular manner and after visual evaluation were tested for tensile retention on a recording tensile tester.

TABLE 3. REPRODUCIBILITY PERFORMANCE GIVING RELATIVE RATING AT VARIOUS ELONGATIONS

0 = No cracks
5 = Badly cracked

For Runs 196 and 206 ozone concentration 0.25 ppm Time 7 hrs. Room temp.
Run 265 .05 ppm 44 hrs. Room temp.

		Elongation					
		Static			Dynamic		
Stock No.	Run No.	12½%	25%	37½%	0–10%	0–20%	0–40%
3114	196	5	2	1	5	3	1
Hevea gum	206	2	1	1	1	3	2
stock	265	4	2	1	4	3	1
3116	196	5	1	1	5	3	1
Hevea black	206	4	2	1	4	3	1
loaded stock	265	3	2	1	4	3	*
3117	196	3	1	0	4	2	1
Hevea white	206	3	1	0	2	2	1
loaded stock	265	5	4	3	5	5	5
3118	196	5	2	1	3	3	2
GR-S gum	206	2	1	1	1	2	*
	265	4	2	1	2	2	1
3120	196	5	2	1	5	4	2
GR-S black	206	4	3	1	2	4	1
loaded stock	265	3	2	1	3	2	1

*Broken.

The results obtained by the two methods agreed remarkably well.

Only results obtained on *Hevea* and GR-S stocks are shown in Table 3, since the GR-M and GR-I stocks were so very ozone resistant in comparison to *Hevea* and GR-S stocks that little or no checking was obtained.

Effect of Ozone on Various Polymer Formulations

A large number of tests has shown that the ozone resistance rating of the four polymers in the different formulations investigated, in order of decreasing resistance, is as follows: GR-I, GR-M, *Hevea*, and GR-S. This order was maintained at all temperatures, elongations, and ozone concentrations investigated.

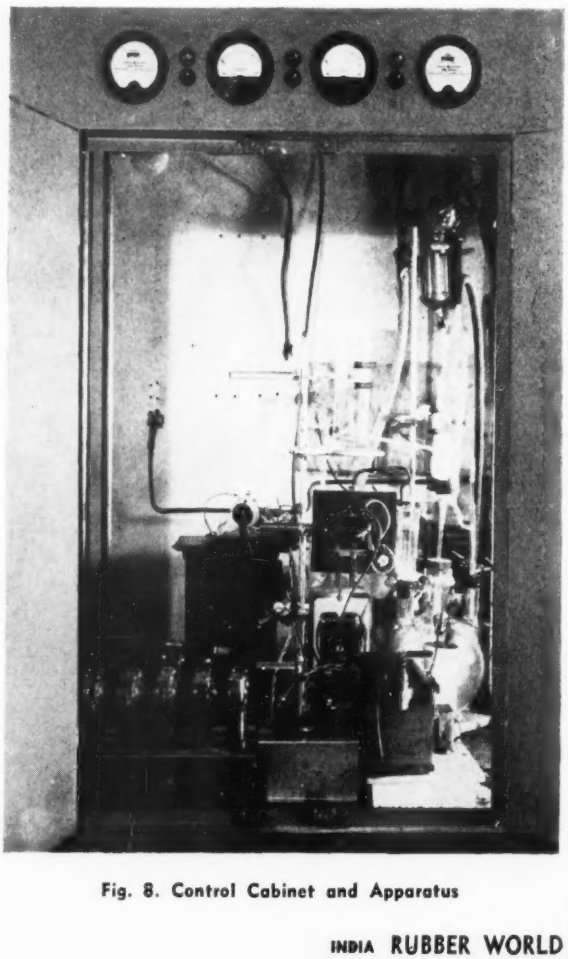


Fig. 8. Control Cabinet and Apparatus

It should be emphasized further that the GR-I stocks were exceedingly ozone resistant, as the chemical structure would indicate. The GR-M stocks were quite resistant, and the *Hevea* and GR-S stocks were quite similar to each other, and both were much less ozone resistant than the other two stocks. A comparison of the two groups is indicated by the amount of time required to produce definite checking on samples at a given ozone concentration, elongation, and temperature. Definite checking can be produced on *Hevea* and GR-S stocks at 12½% static elongation and 0-20% dynamic elongation in seven hours at room temperature by an ozone concentration of 0.25 ppm. (This fact has been confirmed by numerous results in addition to those in Table 3.) GR-M stocks will show very slight checking after 50 or 60 hours under the same test conditions; while GR-I stocks will withstand more than 60 hours of exposure to the above test conditions. The latter two stocks were found to be so ozone resistant that no data have been obtained to date for use in demonstrating the critical elongation, the effect of ozone concentration, temperature, light, and humidity for these stocks. In other words, test conditions severe enough to bring out differences sufficient to establish even qualitative ratings have not been investigated as yet.

The difference in the effect of ozone alone at various elongations is quite pronounced for both *Hevea* and GR-S stocks. Many tests were conducted on all the *Hevea* and GR-S stocks listed in Table 3 at static elongations of 6¼, 12½, 18¾, 25, 37½, and 50% and at dynamic elongations of 0-10, 0-20, 0-30, 0-40, 0-60, and 0-80%, at several ozone concentrations and exposure times. In all stocks within these two groups, the maximum ozone attack was found to occur at approximately 12½% static elongation and 0-20% dynamic elongation. The cracks were larger in size and deeper, but fewer in number, than for the higher elongation and were larger and deeper, though more numerous, than for the lower elongations. It should be stated here that no cracking was ever observed unless the rubber sample was strained.

In all cases where the ozone concentration was controlled, covering concentrations from 0.05 ppm to 2.0 ppm of ozone, the rate of attack was judged to vary linearly with the concentration.

Effect of Light on Evaluation Stocks

As was indicated in the first part of this paper, considerable work has been reported on the effect of light on rubber goods. It was shown there that certain authors concluded that light was quite detrimental, while others concluded that light may actually be beneficial in inhibiting ozone attack.

In the present work, samples have been exposed to light of several wave length bands and for various times at a variety of elongations. By the use of the various filters, rubber samples were exposed to a light source transmitting all wave lengths above 2200, 2900, 3400, 5000, 5100Å and to wave lengths below 5000Å at a variety of elongations. In no case was there any visible effect produced after test periods of eight hours.

Samples which had previously been exposed to light for a period of seven hours, especially in the wave length region between 2900 and 5000Å, showed a definitely higher ozone resistance than fresh samples exposed concurrently. The improvement was much more pronounced on the surface that faced the lights directly than on the rear surface which received less light and only reflected light. The reduction in ozone attack was quite definite and could be readily detected by comparing samples given a pretreatment of light followed by light and ozone, with samples exposed to ozone and light concurrently.

In no case on the *Hevea* and GR-S evaluation stocks was there any evidence of light having a deteriorating effect. Again it should be stated that the GR-I and GR-M stocks proved to be so much more ozone resistant that no checking was produced in the tests conducted.

Effect of Temperature on Evaluation Stocks

Samples of all evaluation stocks shown in Table 2 were exposed to a range of static and dynamic elongations at several temperatures, over the temperature range of —50 to 100° C., for times up to 20 hours, *in the absence of ozone*. In no case was there any visible permanent effect due to the several temperatures on the stocks. Of course, the stocks stiffened at the low temperatures, but subsequently became normal at room temperature. On the high temperature tests the severity of test conditions was not great enough to produce tackiness.

In the presence of ozone, Hevea and GR-S evaluation stocks showed that the ozone attack was slightly reduced at the low temperatures and increased at temperatures up to 50° C. For the temperatures between 50 and 100° C. the ozone attack appeared to level off. Several factors may cause this effect, such as: (a) bleeding out of certain pigments to the surface; (b) destruction of the ozone as it contacts the surface; (c) failure of the ozone control apparatus to function when sampling the air at such elevated temperatures.

It is known that certain stocks become slippery or have a shiny finish at elevated temperatures. It may well be that these effects are produced by the migration of certain pigments to the surface and the formation of a protecting film. It has been demonstrated that ozone is more unstable at elevated temperatures. A simple experiment in which an ozone generator is maintained at a constant setting and the ozonized air is passed through a glass tube to a sampling apparatus can be used to demonstrate this fact. At normal temperatures the presence of ozone is quite apparent by the discoloration of a potassium iodide solution. If, however, the connecting tube is heated gently by a flame, or otherwise, the rate of discoloration drops sharply. No controlled experiments were conducted to determine quantitatively the effect of temperature, but such qualitative experiments as those described above on ozone demonstrated the effect.

From the data obtained to date it appears that the degradation effect due to ozone is slightly temperature dependent. The effect is small, however, and is difficult to perceive over the temperature range —40 to +50° C.

Effect of Humidity on Evaluation Stocks

Strips of the several evaluation stocks showed no visible deterioration as a result of being tested for extended periods, both statically and dynamically, at several different relative humidities. In the absence of light with ozone present, no apparent difference in the ozone attack at relative humidities below 70% was noted. At relative humidities above 70% there was an apparent increase in the rate of ozone attack, but it is felt that this impression is false. The reason for the above statement is that moisture tended to condense out of the sample line at the control venturi and hence restrict the flow of air. This condition resulted in the requirement that the air, because of the lower volume, which did pass the orifice had to have a higher ozone content to balance the addition of the sodium thiosulphate control solution on the basis of a sample flow rate of 30 ft.^{3} per hour.

Results and Conclusions

1. A literature survey indicates that there is a wide divergence of opinion as to the relative roles played by

the principal weathering factors, although the more recent literature emphasizes the role played by ozone. The results obtained in this laboratory support the latter concept. In fact ozone was found to be the only weathering agent which, alone, could produce visible effects on stocks compounded from *Hevea*, GR-S, GR-M, and GR-I polymer formulations. The other four main factors caused variations in the rate of ozone attack, but did not of themselves produce visible deterioration in the test periods used.

2. A method of controlling the concentration of ozone in a test chamber has been developed and is described.

3. A weathering apparatus has been designed and built which offers great flexibility with respect to independent control of each weathering agent. The number of samples, the type of stressing, and the rate of stressing of the sample are also easily varied.

4. A rather complete system of light filters and a light source are described. The system offers the advantages of cleanliness, freedom from excessive heat radiation, high intensity in a compact source, and the operating and replacements costs are relatively low.

Acknowledgments

The authors wish to acknowledge the assistance and encouragement of many persons; F. W. Stavely and John W. Liska for their encouragement and technical guidance; Frank Grover and the shop for their aid in the construction of the apparatus; and Joseph Koch for his part in the design of the apparatus. Special thanks go to J. H. Findley for his untiring efforts in the actual testing program.

The authors wish to thank The Firestone Tire & Rubber Co. for permission to publish this article.

Glass Fibers

(*Continued from page 52*)

glass by alkali present in the mix.

It might be expected that minimum pH and gelation time in a given recipe would be reached at maximum glass content. This point actually is the case if whipping is continued until the foam volume is equal in each case, as shown in Figure 2. As pointed out above, some thickening of foam results on loading with glass. This thickening necessitates progressively longer whipping time intervals as glass content is increased to effect equal percentages of expansion. This is a direct result of optimum dispersion of glass particles in the allotted whipping time at this intermediate glass content. The major factor contributing to a pH and gelation time minimum at some intermediate glass content, when all mixes in a series are whipped during constant time intervals, is doubtless the maximum glass surface exposed (to leaching action) per unit volume of foam.

Summary and Conclusions

Incorporation of hammer-milled glass fiber of appropriate dimensions in foamed rubber latices has been found to produce thickening of the mixes and is thus of value as a foam stabilizer. Substantial amounts of glass fiber may be added to most latex foams without producing sufficient thickening to cause serious pouring difficulties.

The sensitivity of foamed rubber latices toward gelation is enhanced by addition of glass fiber. In a given recipe, at constant degree of expansion, gelation times become progressively shorter as glass content is increased provided there are no other variables. Studies indicate that changes in gelation characteristics are brought about through pH changes which probably result from the leaching action of alkali present in the rubber latex on glass fiber.

Practical aspects of glass fiber added to foamed rubber latices include foam stabilization, sensitization toward gelation, and improved physical properties of products made from such foams. All these effects are obtained simultaneously through incorporation of the optimum quantity of glass fiber. The actual amount of glass used varies with the requirements of the specific application being considered. The material offers interesting possibilities in "tailoring" foams and foam rubber products to fit the job.

The authors wish to acknowledge the valuable aid given by the research assistants, Robert E. Boyd and George Frank, in carrying out part of the experimental work covered in this paper.

Notes from South America

At the request of the Government of Peru, two scientists of the United States Department of Agriculture and Peruvian associates have drawn up a plan for establishing improved *Hevea* trees on 2,500 hectares (more than 6,000 acres) in Peru. The trees have been developed by a technique of double grafting which gives them highly productive stems and, at the same time, crowns resistant to the destructive South American leaf-blight. Suitable stock is first budded with high-yielding material from the Far East, and when the budgraft is six feet high, it is top-worked with a bud from a disease-resistant strain. Some 40,000 of these young trees are being produced annually in the nurseries of the Cooperative Agricultural Experiment Station at Tingo Maria, Peru, and later transplanted on demonstration farms of the Corporacion Peruana Del Amazanos, which is in charge of all rubber production in the country.

It is recommended that the planting program be carried out in two five-year periods, starting in 1952, with part of the expansion on small farms, and the rest on plantations. The new plantings when mature, are expected to produce about 2,400 tons of dry rubber annually. Peru's present annual production of rubber from wild *Hevea* is about 1,500 tons.

Brazilian production of crude rubber totaled 9,156 tons in the first quarter of 1951, against 8,780 tons in the same period of 1950. Production of natural gums in 1950 included 2,018 tons of sorva, 1,203 tons massaranduba, 584 tons balata, and 545 tons coquirana. It is estimated that the 1951 harvest will be at approximately the same level.

"**Extruded Plastics.**" Anchor Plastics Co., New York 13, N. Y. 8 pages. This illustrated brochure describes the company's facilities for custom extrusion, the range of extrusions available, and applications of extrusions to particular products. A review of the various thermoplastics is included together with a table of comparative properties.

Editorials

The Growing Crisis in Technical Manpower

"THE technology of our country is at a critical point. If we are to be the Arsenal of Democracy we must out-design and out-produce our enemies. Our very survival depends on so doing. And to maintain military superiority—which may be necessary for a long, long time—we must continually keep ahead in technical achievement.

"To play his part, each individual, particularly in this emergency, must so devote himself to his own task that the total engineering output shall not suffer by his deficiency. If an employer of engineers, he should see that his organization makes the maximum practicable contribution to the sum total of engineering requirements. As individuals and as members of local engineering organizations we must encourage increasing numbers of able young men to enter the profession."

The above remarks are taken from an address by Carey H. Brown, chairman, Engineering Manpower Commission, Engineers Joint Council, given before the National Engineering Manpower Convocation in Pittsburgh, Pa., on September 28. The purpose of the Convocation was to establish a "grass roots" program to convince the general public of the vital importance of the technical man to our way of life and, more particularly, to acquaint industrialists, educators, and engineers with the program developed by the Engineering Manpower Commission to combat the problems created by the critical shortage of engineers.

Earlier in September, as a result of the action of the present Congress in reducing the budget of the National Science Foundation from $14 million to $300,000, James J. Conant, chairman of the Foundation, warned:

"It has been repeatedly emphasized that the nation now faces a critical shortage of men and women adequately trained in science, engineering, public health, medicine, and other technical fields. Industry, education, and government, including the military services, are finding it impossible to fill positions of critical importance to the national defense and national welfare. To meet this urgent need, the National Science Foundation has proposed the establishment of a program of fellowships in pure and applied science. This program would help increase the supply of these critically needed scientists and engineers. Unless funds are provided, this program must be abandoned and the manpower deficit will become increasingly greater."

It has become obvious that manpower planning which has taken place up to the present time is completely unrealistic and inadequate and does not provide a basis for the maintenance of the armed strength which the Department of Defense has indicated as essential, according to M. H. Trytten, National Research Council, speaking before the above mentioned National Engineering Manpower Convocation. The following quotation taken from a statement made by the Institute of Manpower Utilization and Government Personnel, following a meeting held at Stanford University, August 22, was included in Mr. Trytten's address:

"Assuming that military requirements necessitate the maintenance of an armed establishment of 3.5 million men, it is our opinion that this cannot be accomplished within the present statutory requirements and administrative policies. Moreover, it is essential that present statutes and policies be further amended to insure that an adequate proportion of the number coming of age each year be selected for training in the sciences, professions and skilled crafts so as to be available for specialized service where most needed in the military forces or in civilian employment after their training is terminated."

The nation and those industries in particular requiring scientific and technical personnel were lulled into a false sense of security about a year ago by the prevailing opinion that engineering and scientific graduates were in oversupply. The Engineering Manpower Commission deserves much credit for working to correct this impression. Also, in this connection, the American Chemical Society has just initiated "A Proposed Educational Program to Acquaint the American Public of the Role of the Scientist and Engineer and the Impact of Science and Technology on Modern Living."

Organizations in the Federal Government have been exceedingly slow to recognize the importance of technical manpower. Recently there have been established a National Manpower Policy Committee and an advisory committee on specialized personnel in the Office of Defense Mobilization. Other agencies of the government are now beginning to pay more attention to the proper utilization of scientific and technical manpower.

It remains, however, for the manufacturing and other industries, whose very life depends on an adequate supply of technical personnel, to realize the importance of this situation and through professional and scientific societies, in which many of their employes are members, and through their trade associations, to raise their voices in vigorous support of the program of the Engineering Manpower Commission and the appropriation of adequate funds for the National Science Foundation. Studies by the Commission have shown that the deficiency in engineers and in science graduates during the next several years may be about 30,000 yearly in each case.

R. G. Seaman

DEPARTMENT OF
PLASTICS TECHNOLOGY

Problems with Large Phenolic Moldings[1]

Frank J. Donohue[2]

FOR 30 years the consumption of phenolic materials has grown steadily, although usually without spectacular fanfare. Phenolic plastics were recognized first as superior electrical insulating materials for such uses as wiring devices, motor controls, switch gears, and communication parts, and the increasing use of these materials in these items in the decade from 1920-1930 caused a wider appreciation of their happy and desirable combination of useful properties. These properties include heat and chemical resistance, low moisture absorption, light weight, and low heat conductivity. This growing appreciation led to new uses in the consumers goods field which, over the years, have formed an impressive roster that includes cooking utensil handles, electric iron handles, telephone handsets, closures, containers, washing machine agitators, radio cabinets, adding machine housings, and, latest but far from least, television cabinets.

Along this long and often thorny road have been some notable milestones, points where phenolics carved out places for themselves that were outstanding tributes to their own merits and to the imaginative engineering and merchandising of the molders and suppliers who fostered these applications.

Phenolic plastics were a potent factor in the growth in manufacturing of radio broadcasting and receiving equipment during the Twenties and Thirties. You can trace their path all the way from the coil forms, panels, dials, and knobs of early "build-them-yourself" kits, through the first crude plastic radio cabinets and up to the smooth, streamlined, beautifully styled cabinets of today.

When the growth curve of phenolics showed signs of leveling off, and some misgivings were felt about their future, there came the latest milestone in their use, the 35-40-pound molded television cabinets. These large moldings challenge the imagination and point the way toward greater and newer fields of usefulness not only for phenolics, but for other plastics as well.

Television cabinets are the big brothers of the radio cabinets of yesterday and today and evolved in a series of steps, as illustrated in Figure 1. These cabinets have presented on a larger scale many of the molding problems previously encountered with their smaller brothers, the radio cabinets, and have also posed some new and difficult problems peculiar to themselves. The most important of these problems have been plastic flow, mold release, molded appearance, and strength.

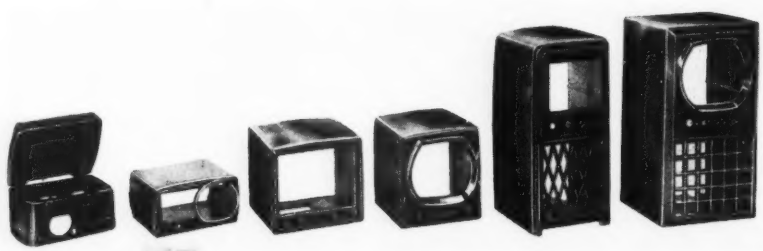


Fig. 1. Evolution of Molded Phenolic Plastic Television Cabinets

Plastic Flow

In order to mold a cabinet 18 inches wide, 17 inches deep, and 20 inches high without using enormous molding pressures, the material must have special plastic flow properties. This point is even truer when one undertakes to mold something like the Admiral console which weighs about 42 pounds and measures 34 by 18 by 18 inches. Long flow alone is not the answer. We have had long-flow phenolics for years, but these were usually also slow flowing and slow curing materials.

What is needed in this case is a rapid flow material which will complete its flow in a minimum time and then set hard. The need of rapid flow can be appreciated in view of the fact that it is necessary to squeeze 16-35 pounds of material that is becoming momentarily more viscous and infusible up into four narrow spaces 20 by 18 and only 3/16-to 1/4-inch wide in about 20 seconds.

The need of rigidity of set is equally apparent when we consider that a concentrated pressure of 20-40 tons is applied momentarily through the ejector pins on the ¼-inch wide edge of the piece at the beginning of ejection. If the piece is not extremely rigid, it will buckle, warp, or break upon discharge from the mold. It was necessary to spend considerable time in research and actual molding work before material with the right flow characteristics was developed.

In Figure 2 are drawn some idealized curves illustrating the flow of thermosetting phenolic materials with respect to time. The "ideal flow curve" shows the type of flow the molder desires and needs for present-day large compression and transfer molds. This curve is quite flat, indicating extremely rapid flow. The flow time is measured by the vertical intercept OA from the origin to the point of inflection on the curve when flow has practically ceased.

This curve is the ideal toward which the material suppliers have been working in recent years in their efforts to supply the "softer and faster" material desired by the molders.

Curve 3 in Figure 2 is characteristic of the type of flow that occurs with materials now being furnished for molding television cabinets. The flow time here, OB, is somewhat longer, and the flow rate less rapid than for the ideal material, but is markedly better than those of Curves 1 and 2. These latter curves represent the flow-time characteristics of the usual stiff and medium-flow general-purpose phenolics. Although the flow times for Curves 1 and 2 are longer than that of Curve 3, the total flow is less.

These flow curves, although based on actual experience and laboratory measurements, are considerably idealized. They illustrate, however, the faster flow rates needed on these newest applications. It should be emphasized that smooth, uniform flow is also required for best results. Any tendency of the material to squirt or surge unevenly at different points in the mold leads to a variety of troubles, including color segregation, distortion of mottle pattern where used, and porous or semi-filled low density areas in the housing.

It is far from my intention to minimize the very effective role of electronic preheating in molding these large cabinets. Such preheating is vitally necessary, and the introduction of newer and more efficient preheaters that rapidly heat large amounts of phenolic material has been an invaluable contribution.

Mold Release

Once having molded this 20-40-pound cabinet, the molder's next task, and sometimes a troublesome one, is to open the mold and get the piece out without using sledge hammers or crowbars, or chilling

[1] From a symposium on "Distribution and Production Picture on Large Injection and Compression Moldings," presented before National Technical Conference, Society of Plastics Engineers, Inc., New York, N. Y., Jan. 19, 1951.

[2] Technical service manager, thermosetting molding materials, plastics division, Monsanto Chemical Co., Springfield, Mass.

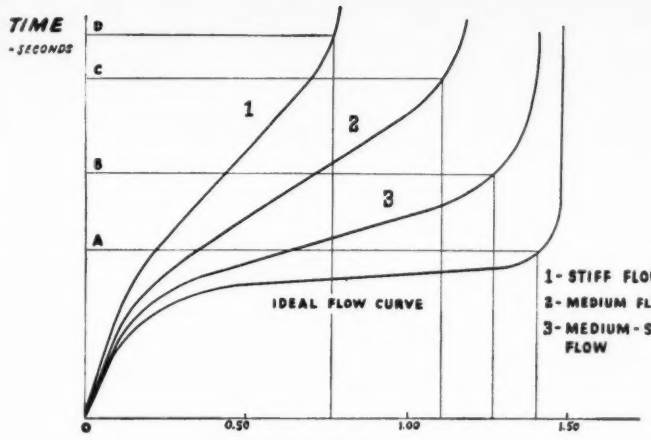


Fig. 2. Flow Characteristics of General-Purpose Phenolic Molding Materials

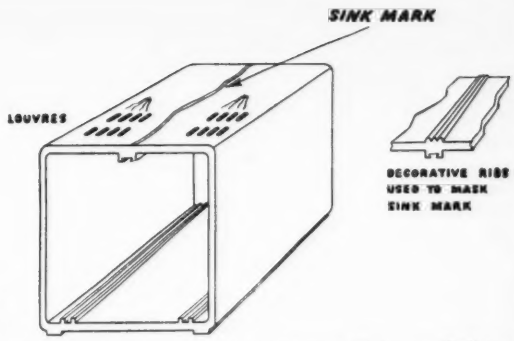


Fig. 3. Effect of Molded Internal Ribs on Surface Appearance of Phenolic Television Cabinet

the mold with ice water after every shot. Molders have an axiom that no part is too complicated to mold, but some cannot be removed from the mold afterward.

Because of their depth and the large amount of surface area in proportion to wall section, television cabinets present special problems of mold release. Adequate taper and well-polished mold surfaces are absolutely essential to facilitate opening of the mold and ejection of the piece. I will leave to the molders any debate on the relative merits of converging or parallel tapers and would also hesitate to make any firm recommendations on minimum taper. I would suggest, however, taking as much as the design and tolerances will allow, and providing at least 0.5-degree taper or 0.0087-inch per inch of depth.

Even with sufficient taper, well-polished mold surfaces, and a suitable material, a pull-back pressure of 40 tons may be required to open a big cabinet mold, particularly when new. If the material is not suitable, you may well lock the mold up tight. As a result of experience, we have found that good mold release on these jobs depends on proper lubricant content and good rigidity in the material, and, above all, on using the proper flow for the job. Although it may fill the piece, a material that is too stiff is much more likely to jam the mold than one that is too soft, probably because excessive back-pressures and wedging forces are set up as the mold closes.

Molded Appearance

Lumped under this category are such phenomena as color segregation, surface streaking, orange peel, sink marks, and others. These defects may be due to material properties or to features of the cabinet design, but are equally troublesome, no matter what the cause.

Many of the phenolic television cabinets so far produced have been molded from walnut or mahogany mottle colored materials to simulate wood grain effects. Instead of displaying the contrasting color striation or burled mottle effects desired, the cabinet will sometimes show either muddy areas where the component colors have blended together, or a "pepper and salt" effect where the color components show too little blending and stand out in discrete spots in the finished part.

The blending into one muddy, composite color usually occurs when the material used is too soft, or the granulation of the components too fine. The obvious solution is to use a material of stiffer plasticity and somewhat coarser granulation. Decreasing the preheating cycle will often be a help by producing a slower and more uniform flow in the mold.

The pepper and salt effect is usually a function of the cabinet design and is not readily eliminated by material changes. This effect shows up where flow of the material is slowed up or interrupted by passing around cores and pins in the mold used to form louvre, tube, or dial openings.

Abrupt contour changes at these points should be avoided in designing the cabinet. These openings must be provided, but transition curves, generous radii, and rounded surfaces should be utilized to minimize these flow blocks. The positioning of the material charge in the mold is often of importance, and a change in positioning of the preforms will often eliminate or improve this condition.

Excessive orange peel or dogskin on the surface of the piece usually indicates insufficient back-pressure because the material is too soft, flows too rapidly, and escapes too readily when the mold closes. The obvious remedy is to use a stiffer material.

Dull spots and streaks on the cabinet surface may result from a number of causes. One cause which is less obvious and sometimes overlooked is moisture which has condensed on the top electrode of the preheater and dropped on to the preforms. Excessive preheating will also cause a somewhat similar effect. The remedies are self-evident once the cause is recognized.

Most television cabinets contain interior ribs to provide mountings for the chassis and, in the case of later models, to hold the aerial fastened inside the cabinet. These ribs, particularly when of heavy cross-section, often cause sink marks or groove-like depressions on the opposite or outer surface of the cabinet, as shown in Figure 3.

This condition is of minor importance in the case of the chassis mounting ribs which are usually on the bottom of the cabinet where the sink marks are out of sight. The other ribs, however, usually traverse the inner surfaces of the top or sides of the cabinet, giving sink marks that are plainly visible and very objectionable, particularly if accompanied by discoloration or distortion of the mottle pattern.

The fundamental cause and solution of this difficulty lie in the cabinet design. To avoid sink marks on the surface the width of the rib at the root (or point where it joins the wall) should be no greater than that of the adjacent wall section. The height of the rib should be kept to a minimum, preferably not greater than twice the thickness of the wall section.

Where some other design consideration prevents changing the rib width and height, the sink marks may usually be masked by a decorative bead or flute on the outside surface over the rib, as shown in Figure 3. When this remedy cannot be used because it interferes with some other design feature or violates the designer's esthetic sense, the only other solution is to reduce the mold temperature and the amount of preheating, thus slowing down the flow of the material and reducing the differential shrinkage at the critical section.

Unfortunately this solution is frequently only a partial remedy, since it may decrease, but not wholly eliminate the objectionable sink marks. On the other hand, it will almost certainly increase the cure time, reduce production from the mold, and wring cries of anguish from the molder and the television set manufacturer. In this case, certainly, preventive rather than corrective remedies are more desirable.

Strength

The problem of providing sufficient strength in a television cabinet should be no more difficult than in a smaller housing, but is more important for the following reasons:

(1) A television set is a higher priced home appliance, and the usual purchaser expects full value for his outlay, including a cabinet that will withstand all reasonable normal usage.

(2) Some of the circuits in television sets operate at potentials of 12,000-18,000 volts, and breakage of the cabinet may expose the user to a dangerous shock hazard. This possibility should certainly be guarded against in the cabinet design.

(3) Television assemblies are considerably heavier than radio sets, and there is greater danger of cabinet breakage during final assembly because of improper handling.

Proper strength in these phenolic cabinets is not a matter of luck or guesswork; it can be provided by following correct design practice, such as adequate and uniform wall sections, and proper use of fillets and radii, to avoid local stress concentrations. In most of the cabinets on the market these practices have been carried out, and we hope they will continue to be used in the future.

SPE Sections Meet

FORTY-TWO members and guests of the New York Section, Society of the Plastics Engineers, attended the annual business meeting on September 19, at the Gotham Hotel, New York, N. Y., marking the start of the new season of activities. Section president George Baron, Ideal Plastics Corp., presided over the meeting, which included a cocktail hour, dinner, and business session. Reports were heard from Secretary-Treasurer Arthur GeWertz; House Chairman William Lewi, Dusal Tool & Mold Co.; Membership Chairman R. L. Skidmore, Celanese Corp. of America; Program Chairman, Harold Schwartz, Empire Brushes, Inc.; Favors and Prizes Chairman Richard Stott, Stott Tool & Machine Co.; and Publicity Chairman A. M. Merrill, India RUBBER WORLD.

The meeting was then thrown open to general discussion of subjects of interest to the members. A lively debate followed on such topics as attracting new members, future meeting programs, the Section's educational program, better use of the group's employment services and panel of experts, and others. Table favors were distributed through the courtesy of G. P. Humphrey, manufacturers agent, and the meeting closed with a drawing for door prizes contributed by Riverdale Laboratories and Waljohn Plastics, Inc.

Miami Valley Section Picnic

The Miami Valley Section began a new season of activities with its annual fall picnic on September 6 at Old River Park, Dayton, O. Some 56 members and guests enjoyed the facilities of the park, with the feature events being a miniature golf tournament and a horseshoe pitching contest. A hot picnic dinner was served in the evening, and the program concluded with a talk and demonstration of "Precision Printing with Porous Rubber," by Paul A. MacPhee, National Cash Register Co. Prize winners in the miniature golf tournament included Ralph Blair, National Cash Register; Edwin Gerdes, Plastic Moldings Corp.; and Gil Carpenter, Tennessee Eastman Corp. Chester Kruger again served as picnic chairman and was assisted by B. W. Nelson, National Cash Register.

Newark Section Opens Season

The Newark Section, SPE, began the new season with a regular dinner-meeting on September 12 at the Military Park Hotel, Newark, N. J. Approximately 75 members and guests heard G. C. Holbrook, Wheelco Instruments Corp., speak on "Instrumentation of Plastic Processing Equipment."

Mr. Holbrook's talk concerned design and construction problems with automatic temperature control units for plastic processing equipment. These problems are complicated by the fact that the manufacturers of injection machines and extruders must design their equipment to handle a variety of plastics whose thermal conductivity properties cover a wide range. As a result, these machines represent a compromise which may or may not be the ideal one for a specific material from the standpoint of thermocouple location. The temperature controller must be so designed that it will give the best possible results under these conditions. Recent developments in instrumentation have been aimed toward reducing the time lag inherent in all temperature control systems, with the ultimate goal being a unit that will maintain a constant temperature regardless of changes in frictional heat output.

CALENDAR

Oct.	17.	New York Section, SPE. Hotel Gotham, New York, N. Y.
Oct.	18.	SPI-SPE Joint Dinner-Meeting. Toronto Chapter. St. Regis Hotel, Toronto, Ont., Canada.
Oct.	19.	Akron Rubber Group. Boston Rubber Group.
Oct.	21-27.	Cleaner Air Week in the United States and Canada.
Oct.	22-24.	Packaging Institute. Annual Forum. Hotel Commodore, New York, N. Y.
Oct.	23.	Buffalo Rubber Group. Hotel Westbrock, Buffalo, N. Y. Association of Consulting Chemists & Chemical Engineers. Annual Meeting. Hotel Shelburne, New York, N. Y. Washington Rubber Group. Annual Banquet and Installation of Officers. Washington National Airport Terrace Dining Room.
Oct.	26.	New York Rubber Group. Henry Hudson Hotel, New York, N. Y.
Oct.	29.	Cleveland-Akron Section, SPE.
Nov.	2.	Philadelphia Rubber Group. Poor Richard Club, Philadelphia, Pa.
Nov.	9.	Chicago Rubber Group.
Nov.	11-13.	Western Sporting Goods Dealers Assn. Convention and Show. Hotel Biltmore, Los Angeles, Calif.
Nov.	12.	Cleveland-Akron Section, SPE.
Nov.	14.	Chicago Section, SPE; Midwest Chapter, SPI. Builder's Club, Chicago, Ill. Newark Section, SPE, and New York Section, SPE, Joint Meeting. Hotel Gotham, New York, N. Y.
Nov.	14-15.	International Symposium on Abrasion and Wear. Rubber Stichting, Delft, Netherlands.
Nov.	15.	Rhode Island Rubber Club.
Nov.	25-Dec. 1.	International Congress of Industrial Chemistry. Paris, France.
Nov.	26.	Cleveland-Akron Section, SPE.
Nov.	26-30.	American Society of Mechanical Engineers. Annual Meeting. Chalfonte-Haddon Hall, Atlantic City, N. J.
Nov.	26-Dec. 1.	Chemical Industries Exposition. Grand Central Palace, New York, N. Y.
Dec.	2-5.	American Institute of Chemical Engineers. Annual Meeting. Chalfonte-Haddon Hall, Atlantic City, N. J.
Dec.	13.	Manufacturing Chemists Assn. Semi-Annual Meeting. Waldorf-Astoria Hotel, New York, N. Y.
Dec.	13-14.	SPI Film, Sheeting & Coated Fabrics Division. Third Conference. Commodore Hotel, New York, N. Y.
Dec.	14.	New York Rubber Group. Christmas Party. Henry Hudson Hotel, New York, N. Y. Chicago Rubber Group. Christmas Party. Boston Rubber Group. Christmas Meeting. Detroit Rubber & Plastics Group, Inc. Christmas Party.
Dec.	15.	Southern Ohio Rubber Group. Dinner Dance. Miami Valley Golf Club, Dayton, O.
Dec.	18.	Buffalo Rubber Group. Christmas Party.

New Rigid Vinyl Piping

TUFFSTUFF unplasticized polyvinyl chloride, in the form of extruded rigid pipe and tubing, has been added by Clopay Corp., Cincinnati, O., to its line of industrial plastics. According to I. M. Krohn, Jr., vice president in charge of sales, the piping is expected to find wide use in the chemical, petroleum, mining, food processing, and plumbing fields and should be of great value in replacing critical metals now used in these industries. Extruded in standard pipe and tubing sizes, Tuffstuff is impervious to concentrated acids, alkalies, and many solvents; is rigid, but not brittle; and may be formed, welded, and cemented by conventional techniques, the manufacturer claims.

Army Tests Plastics for Armored Clothing

PLASTICS are employed in armored clothing for protecting troops against low-velocity shell fragments and bullets. Developed by the Army Quartermaster Corps, the clothing will be submitted to field testing in the near future. Included in these tests will be several designs of body armor, a new plastic helmet, and armored seats for use in liaison planes.

Two types of body armor, ranging in weight from 5-15 pounds, depending on the amount of body surface covered, have been developed. One is a rigid type known as the Doron jacket. It consists of a cotton jacket with front and back pockets into which are inserted flat, rigid, laminated glass-plastic panels capable of stopping a .45-caliber bullet at pointblank range. The second type of armor is more flexible than the Doron jacket and consists of several layers of nylon fabric pressed together. Field testing of both types of armor will be made both with and without an inside layer of sponge rubber for added shock resistance.

The new plastic helmet, made of laminated nylon, has been found to be superior to the present steel helmet in resistance to missiles. The helmet has been designed to permit free use of all sighting and communication instruments and give greater protection to the sides of the face and back of the neck. This plastic helmet is worn beneath an aluminum shell which adds to the ballistic properties of the helmet and can also be used as a water container.

The seat armor for liaison planes is a nylon laminate formed to fit the plane seat and protect the pilot from ground fire.

Plastisol for Vinyl Foam

A NEW-TYPE vinyl plastisol, capable of being expanded into foam at relatively low temperatures without application of pressure, comes from Interchemical Corp., New York, N. Y. The time-temperature cycle for making vinyl foam with this plastisol is determined by the density and thickness required; thus an expanded form ⅛-inch thick with a density of 12 pounds per cubic foot can be made in 10 minutes at 350° F. The company also formulates conventional vinyl plastisols for use in slush molding, dipping, coating, etc.

Scientific and Technical Activities

Symposia Program and Goodyear Medal Award Feature Rubber Division, A. C. S., New York Meeting

Chairman Fielding Presenting the Goodyear Medal to W. C. Geer

THE fifty-ninth meeting of the Division of Rubber Chemistry of the American Chemical Society, held in conjunction with the one hundred twentieth (Diamond Jubilee) meeting of the Society, took place at the Hotel Commodore, New York, N. Y., September 5, 6, and 7. The Division meeting was featured by symposia on compounding, dynamic properties of rubber-like materials, ozone cracking, preparation of synthetic rubber, properties of synthetic rubber, and natural and synthetic latices. The Goodyear Lecture was delivered before the Division by W. C. Geer, consultant and former director of research for The B. F. Goodrich Co., on the afternoon of September 6, and the Goodyear Medal was awarded to Dr. Geer at the Division banquet the evening of the same day.

J. F. Fielding, Armstrong Rubber Co., chairman of the Rubber Division, opened the technical sessions on September 5 with a welcome to the members and guests present, particularly those from overseas. He called attention to the special effort of the symposia chairmen in preparing their programs and participated jointly with these chairmen at each of the half-day technical sessions. About 850 members and guests of the Division were registered for the meeting. The accompanying photograph shows Division Chairman Fielding with symposia Chairmen G. R. Cuthbertson, United States Rubber Co.; J. W. Liska, Firestone Tire & Rubber Co.; A. E. Juve, Goodrich; J. D. D'Ianni, Goodyear Tire & Rubber Co.; and L. A. Wohler, Firestone Tire & Rubber Co. W. B. Reynolds, Phillips Petroleum Co., the sixth symposia chairman, could not be present when this picture was taken.

Chairman Fielding also thanked the local committee on arrangements headed by D. E. Jones, American Hard Rubber Co., and including T. A. Builifant, Barrett Division, Allied Chemical & Dye Corp., in charge of registration; J. Breckley, Titanium Pigment Corp., in charge of meeting room arrangements; and George Vacca, Bell Telephone Laboratories, in charge of the banquet, for their work in connection with the meeting. E. B. Curtis, R. T. Vanderbilt Co., handled the arrangements for the suppliers' cocktail party.

The 25-Year Club Luncheon Meeting

A record attendance of 200 was present at the luncheon meeting of the 25-Year Club of the Rubber Division, held at the Hotel Commodore, September 5. A. A. Somerville, Vanderbilt, was chairman of this meeting.

Dr. Somerville first presented the incoming "freshmen" to the 25-Year Club members and then the two oldest members of the Club present, Al Glidden, formerly of Goodrich's Hood Rubber Division, and W. E. Kavenagh, Goodyear, both of whom have been associated with the rubber industry for more than 50 years.

The results of the work of a committee consisting of H. A. Winkelmann, Dryden Rubber Division, Sheller Mfg. Corp.; Bruce Silver, N. J. Zinc Co.; and E. Babcock, Firestone; which had been charged with determining the scope of any projects that the Club might sponsor, were reported by Dr. Somerville. Of the several projects suggested by various members, it was found that the desire of the majority was to keep the activities of the Club on an informal basis, and that the only new activity to be sponsored by the Club would be the presentation of an award to the member having the longest service, present at future meetings. Only one such award will be made to a member. E. B. Curtis was appointed chairman of the committee to prepare such a memento to be given at the next meeting of the 25-Year Club.

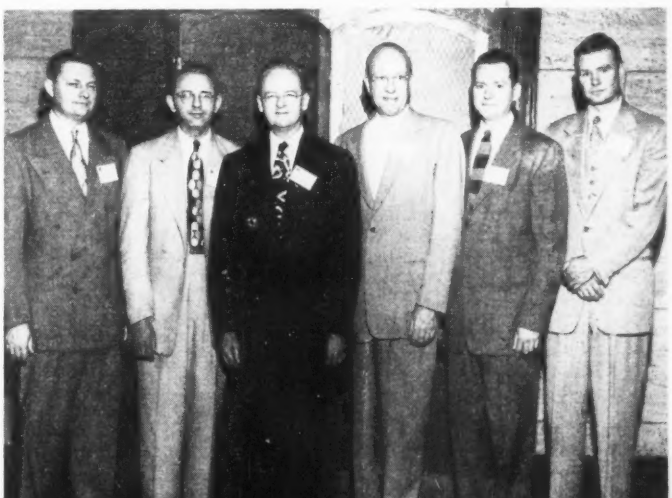
Chairman for the next meetings of the Club to be held in conjunction with the meetings of the Division were: for the spring meeting in Cincinnati, O., A. C. Rude, American Zinc Sales Co.; and for the fall meeting in Buffalo, N. Y., I. Van Valkenburgh, Dunlop Tire & Rubber Corp.

The Division Business Meeting

At the business meeting of the Division on the morning of September 6, Chairman Fielding first asked the members to stand for a moment of silent tribute to four members, R. M. Warner, Goodrich; L. C. Whittemore, L. C. Whittemore, Inc.; David Scott, Sr., Scott Testers Inc.; and J. P. Maiden, Goodyear, whose deaths had occurred since the last meeting of the Division.

It was announced that the Division meetings in 1952 would both be held separate from those of the parent Society. The spring meeting on April 31, May 1 and 2, is scheduled for Cincinnati, and the fall meeting, October 29, 30, and 31, is scheduled for Buffalo.

It was also announced that as a result of the meeting of the executive committee of the Division, the following actions had been taken: (1) The secretary, as well as the treasurer of the Division, is now authorized to sign checks in connection with the use of the funds of the Division. (2) It was decided that it would be a regular policy of the Division to hold at



Division Chairman and Symposia Chairmen for New York Meeting: *(Left to Right)* G. R. Cuthbertson, Symposium on Ozone Cracking; J. W. Liska, Dynamic Properties of Rubber-Like Materials; J. H. Fielding, 1951 Division Chairman; A. E. Juve, Compounding; J. D. D'Ianni, Properties of Synthetic Rubbers; and L. A. Wohler, Natural and Synthetic Latices

least one meeting a year separate from those of the parent Society. The reason for this action was the greater income obtained by the Division from the separate meetings. (3) A new committee composed of two past general chairmen in charge of arrangements for meetings was established to advise future local committees in their work. Members of this new advisory committee on meeting arrangements will serve for four years.

Chairman Fielding announced that the executive committee had decided that the publication of *Rubber Chemistry and Technology* was the most important activity of the Division, and that no reduction in funds for this activity was contemplated.

No immediate decision on the scope of the activities of the new Rubber Library of the Division at Akron University is to be made. The executive committee voted to hold such action in abeyance for at least one year.

A report of the membership committee headed by J. F. Kerscher, Goodyear, was presented by George Vacca in the absence of Mr. Kerscher. New regular members of the Division obtained since the 1951 spring meeting totaled 209, and new associate members added 95, making a total of 304 new members. Total membership of the Division now amounts to 2,329, making the Rubber Division the second largest in the Society. The chairman expressed some concern regarding the rate of growth of the Division which has not been so rapid during recent years and urged all members to cooperate in securing new members for the Division.

A report of election of officers and directors of the Division for the coming year was made by the tellers' committee headed by J. F. Snyder, Binney & Smith Co. Officers for 1952 consist of Waldo Semon, Goodrich Research Center, chairman; S. G. Byam, E. I. du Pont de Nemours & Co., Inc., vice chairman; Amos Oakleaf, Phillips Chemical Co., treasurer; and C. R. Haynes, Binney & Smith, secretary. New directors from areas of the sponsored rubber groups are: S. M. Boyd, U. S. Rubber, Connecticut; G. M. Wolf, Sharples Chemicals, Inc., Detroit; R. A. Claussen, General Tire & Rubber Co., Northern California; B. S. Garvey, Jr., Sharples, Philadelphia; H. L. Ebert, Firestone, Rhode Island; P. O. Powers, Pennsylvania Industrial Chemical Corp., Southern Ohio; and Harry L. Fisher, National Research Council, Washington. Director-at-large is J. W. Ingmanson, Whitney Blake Co.

The Goodyear Medal Address

W. C. Geer, consultant and former vice president and director of research for Goodrich, gave his Goodyear Medal Address on the afternoon of September 6 before members and guests of the Division. The subject was "Strategy in Rubber Research."

Harlan L. Trumbull Delivering His Address on the Goodyear Medalist

The medalist first emphasized that research work has been subject to strategic planning by executives of rubber companies in a manner and to a degree not generally recognized. The industry, as it now exists, with its elaborate research laboratories, highly trained chemists, physicists, and engineers, and the large and steady volume of usable results which come from them, has developed so well because earlier planning had been skillful and adequate, it was said.

Dr. Geer then cited numerous instances of strategy in rubber research drawn from his personal experiences with Goodrich, starting in 1907. He indicated his early belief in the future of synthetic rubber, but pointed out that in 1907 so many more important problems had to be solved for the rubber industry that research on synthetic rubber at that time would have been unwise as a company policy. Brief mention was made of the need in 1907 of a method of accelerated aging and development of the Geer oven for that purpose.

The formation and early days of the Rubber Division, in which Dr. Geer played an active part, were covered, and the reasons for the support and approval of executives of the rubber companies, in those days of secrecy and coded formulae, given.

"That the strategy was sound was demonstrated in 1917-18 when our committees met and solved smoothly and actively the joint problems of national defense," Dr. Geer declared.

An interesting recital of the institution of a fundamental research laboratory at the Goodrich company in 1918-19 was given. Particular tribute was paid to Bertram G. Work, former president of Goodrich, and Arthur H. Marks, the former for his all-round business ability and as a supporter of research in the affairs of the corporation, and the latter for his technical ability coupled with a considerable business sense.

In commenting on rubber research strategy in 1951, Dr. Geer pointed out that the federal government has usurped a detailed control which the rubber industry does not need and certainly does not care for. The powers usurped by our government can and should be yielded to a united industry which can maintain price and sales competition, but from which special ambitions and preferences will have to be eliminated.

In developing plans for the future, Dr. Geer called on the compounders of the industry to standardize and reduce the number of raw materials used and to develop a synthetic rubber truck tire that will easily sustain the heavy loads and high speeds of present and future service. The objectives of rubber research in 1951 are to solve these major problems and provide and produce within the continental United States all the raw materials required by the rubber industry in order that it may be able to manufacture articles which will possess the highest needed qualities of our economic service.

"All the members of the rubber industry should rededicate themselves to the service of the nation, as an independent, strong unit, but not subservient to any group of government officials," Dr. Geer said in conclusion. "We are still a free people. Association in research can be a most potent contribution of the rubber industry toward the preservation of that freedom."

The Division Banquet

The banquet of the Rubber Division, held the evening of September 6 at the Hotel Commodore and preceded by the suppliers' cocktail party in an adjoining ballroom, was the occasion of the presentation of the Goodyear Medal to Dr. Geer and a short address by his former associate, Harlan L. Trumbull, recently retired from Goodrich's research staff.

In this address Dr. Trumbull pointed out how the method of accelerated aging using the Geer oven enabled workers to make faster progress in the development of antioxidants for rubber. He recited his experiences with Dr. Geer and paid tribute to the medalist as a leader in rubber research and development.

The evening was concluded with entertainment in the form of several excellent variety acts.

The Luncheon Meeting of the Rubber Division 25-Year Club

ASME Rubber & Plastics Division Meeting

THE Rubber & Plastics Division, American Society of Mechanical Engineers, will hold a one-day meeting at Chalfonte-Haddon Hall in Atlantic City, N. J., Tuesday, November 27, as part of the annual meeting of the parent Society. There will be two half-day sessions on plastics and one evening session on rubber, and Division Chairman W. Newlin Keen, E. I. du Pont de Nemours & Co., Inc., has indicated that all rubber chemists, engineers, and technologists who may be interested in the program given below will be most welcome at the meeting. No registration fee is charged members of the Society, but non-members must pay a registration fee of $5, which entitles the holder to attendance at all sessions of the Society the entire week.

The titles and authors of the papers to be presented and the chairman and vice chairman for each session follow:

PLASTICS SESSION-I—NOVEMBER 27, 9:30 A.M.
CHAIRMAN: J. H. DUBOIS, PLAX CORP.
VICE CHAIRMAN: J. W. CHURCH, COLUMBIA UNIVERSITY

Effect of Velocity on the Tensile Impact Properties of Polymethyl Methacrylate. B. Maxwell and J. P. Harrington, Princeton University, Princeton, N. J.

On the Accuracy of Extrapolated Creep Test Relations for Plexiglas Subjected to Various Stresses. J. Marin and Joh-Han Pao, Pennsylvania State College, State College, Pa.

High Impact Styrenes—a New Class of Thermoplastic Materials. S. E. Glick and C. H. Adams, Monsanto Chemical Co., Springfield, Mass.

PLASTICS SESSION-II—NOVEMBER 27, 2:00 P.M.
CHAIRMAN: C. M. DOEDE, CONNECTICUT HARD RUBBER CO.
VICE CHAIRMAN: C. F. HOOVER, PEQUANOC RUBBER CO.

High Strength Rubber-Plastic Adhesives. Arman Kearfott and C. W. Roush, General Motors Corp., Detroit.

Rubber-Plastic Compositions. E. S. Ebers, Naugatuck Chemical Division, United States Rubber Co., Naugatuck, Conn.

Selected Plastics Literature References for the Mechanical Engineer—July, 1950, through June, 1951. G. B. Thayer, Dow Chemical Co., Midland, Mich.

Inside the Injection Mold. A 16 mm. moving picture showing the sequences of filling the injection mold will be shown through the courtesy of Dow Chemical.

RUBBER SESSION—NOVEMBER 27, 8:00 P.M.
CHAIRMAN: D. F. FRASER, RODIC CHEMICAL & RUBBER CORP.
VICE CHAIRMAN: B. L. LEWIS, TINIUS OLSEN TESTING MACHINE CO.

A New Rotary Seal for High-Speed and High-Pressure Applications. T. J. McCuiston, Precision Rubber Products Co., Dayton, Ohio.

Properties and Applications of Silicone Rubbers. C. W. Pfeiffer, General Electric Co., Waterford, N. Y.

Selected Rubber Literature References for the Mechanical Engineer—July, 1950, through June 1951. R. E. Shrader and R. M. Turner, du Pont, Wilmington, Del.

SORG Committees

THE Southern Ohio Rubber Group began the season with its fall dinner-meeting on September 20 at the Engineer's Club of Dayton, with 101 members and guests attending. In the business session following the dinner, reports were heard from the various officers and committee chairmen. Stewart L. Brams, Dayton Chemical Products Laboratories Co., who is chairman of the local arrangements committee for the Rubber Division meeting to be held in Cincinnati on April 30 to May 2, 1952, announced the appointment of the following subcommittee chairmen and members: steering, Mr. Brams, Don N. Bertke, Texo Corp., Jack E. Feldman, Inland Mfg. Division, General Motors Corp., and L. J. Keyes, Dayton Rubber Co.; meeting rooms and publicity, Mr. Bertke; registration, R. J. Hoskin, Inland Mfg.; treasurer, Samuel J. Miller, DuBois Co.; banquet, Fred C. Rohel, Amsco Solvents & Chemicals Co.; and displays, C. L. Zimmerman, C. L. Zimmerman Co.

The following members comprise the nominating committee to select a slate of candidates for officers of the Group for the coming year: R. R. Antheil, Inland Mfg.; Carl Cramer, Carl Cramer Co.; E. N. Cunningham, Precision Rubber Products Co.; H. R. Gill, Goodyear Tire & Rubber Co.; G. E. Lang, Premier Rubber Co.; and H. L. Rucker, Dayton Rubber.

Two talks were given in the technical session which concluded the program. W. J. Brown, Wright Patterson Air Force Base, discussed the development and application of jet-type aircraft power plants. G. H. Stempel, General Tire & Rubber Co., gave a review of the papers on high Mooney viscosity synthetic rubbers that appeared in the June-August issues of India RUBBER WORLD.

Philadelphia Group Outing

THE most successful Summer outing in its history was held by the Philadelphia Rubber Group on August 24 at Cedarbrook Country Club. A record attendance of 165 was noted, and some 90 members and guests participated in the golf tournament that was the feature event of the outing. Following golf came dinner and the distribution of golf and door prizes. T. W. Elkin, Jr., Armstrong Cork Co., was chairman of the outing committee, with R. A. Kurtz, E. I. du Pont de Nemours & Co., Inc., in charge of prizes, and W. R. Cleary, Barrett Division, Allied Chemical & Dye Corp., in charge of the golf tournament.

Emery Industries, Inc., Carew Tower, Cincinnati 2, O., has announced increased production of Plastolein 9250 (tetrahydrofurfuryl oleate) resulting from additional manufacturing facilities and increased availability of raw materials. Primarily used as a secondary plasticizer for vinyls, Plastolein 9250 imparts low-temperature flexibility and excellent drape to film and sheeting, it is claimed. The product also is characterized by good oxidation stability, light color, and good heat and light stability. Samples of the material and further data can be obtained directly from the company upon request.

Additional Experimental GR-S Polymers and Latices

THE table below gives the additions and changes in the list of experimental GR-S polymers and latices authorized by the Office of Rubber Reserve, RFC, during the period from July 31 to August 27, 1951.

Normally, experimental polymers will be produced only at the request of the consumers, and 20 bales (one bale weighs approximately 75 pounds) of the original run will be set aside, if possible, for distribution to other interested companies for their evaluation. The 20 bales, when available, will be distributed in quantities of one bale or two bales upon request to the Sales Division of Rubber Reserve, or will be held for six months after the experimental polymer was produced, unless otherwise consigned before that time. Subsequent production runs will be made if sufficient requests are received.

These new polymers are experimental only, and ORR does not make any representations or warranties of any kind, expressed or implied, as to the specifications or properties of such experimental polymers or the results to be obtained from their use.

X-NUMBER DESIGNATION	POLYMER DESCRIPTION
	Changes in Previously Announced Polymers
X-640 GR-S	Charge ratio corrected to read: "75/24.5/0.5 butadiene/styrene/divinyl-benzene."
X-647 GR-S	Changed to read "same as GR-S-101, except shortstopped with potassium or sodium dimethyl dithiocarbamate and sulfur as polysulfide or polyamine."
	New Polymer and Latices
X-657 GR-S	Same as X-648 GR-S, except shortstopped with sodium or potassium dimethyl dithiocarbamate alone or plus polyamine H or equivalent. Shortstopped Mooney viscosity (ML-4), 52±6.
X-658 GR-S	Same as X-657 GR-S, except polymerized to higher conversion.
X-659 GR-S	Same as X-598 GR-S, except emulsified with Armour's K-242.
X-660 GR-S	A mixture of 25 parts of Circosol 2XH and 100 parts GR-S-100. Mooney viscosity of GR-S-100 (MS-4), 65±5. Masterbatch is salt-acid coagulated.
X-661 GR-S	A mixture of 50 parts Circosol 2XH and 100 parts GR-S-100. Mooney viscosity of GR-S-100 (MS-4), 82±5. Masterbatch is salt-acid coagulated.
X-662 GR-S	GR-S-100 stabilized with 1.25% Santoflex B.
X-663 GR-S	A mixture of 25 parts Dutrex 20 and 100 parts of 100 viscosity (ML-4) 41° F. GR-S. Masterbatch is salt-acid coagulated. Base polymer butadiene/styrene charge ratio of 75/25 adjusted to give 20±1% bound styrene, and polymerized at 41° F. Activated with PMHP or equivalent; emulsified with rosin soap L. M. 2.19.0.1 or L.M. 2.19.0.3; shortstopped with DNCB; and stabilized with 1.25% BLE (on the rubber).
X-664 GR-S Latex	Same as X-523 GR-S Latex, except butadiene/styrene charge ratio adjusted to give 20±1% bound styrene.
X-665 GR-S	Butadiene/styrene charge ratio of 76/24 adjusted to give 20±1% bound styrene. Polymerized at 41° F.; activated with PMHP or equivalent; emulsified with rosin soap L. M. 2.19.0.1 or L. M. 2.19.0.3; shortstopped with sodium dimethyl dithiocarbamate and sulfur as sodium polysulfide; and stabilized with 1.25% BLE (on the rubber). Mooney viscosity (ML-4), 60±5.
X-666 GR-S	Similar to X-665 GR-S.
X-667 GR-S Latex	Butadiene/styrene charge ratio 83/17. Polymerized at 41-50° F.; activated with PMHP or equivalent; emulsified with oleic acid; and shortstopped with potassium or sodium dimethyl dithiocarbamate. Solid content, 60% minimum.
X-668 GR-S	A mixture of 25 parts Dutrex 20, 62.5 parts Philblack O, and 100 parts of the base polymer described in X-663 GR-S.
X-669 GR-S	Same as X-668 GR-S, except that the Mooney viscosity (ML-4) of the base polymer is approximately 80.

NEWS of the MONTH

DPA Reviewing Rubber Availability in View of 1952 Requirements; Litchfield Again Urges More Synthetic Capacity

The Defense Production Administration and the National Production Authority were completing in late September a comprehensive review of rubber availability in order to determine how much natural rubber should be made available to consumers and how much should be laid aside for the strategic stockpile. This study was begun before the Senate Armed Services Preparedness subcommittee issued its report on September 4 urging tighter restrictions on consumption to provide more natural rubber for the stockpile.

The Preparedness subcommittee report backfired in that the news services played up the angle of inadequate stockpiling and not the Senators' solution to this problem. An increase in the price of natural rubber on world markets followed, and although the subcommittee disclaimed responsibility for this result, many clarifying statements were required to talk the price of natural rubber back down to near its previous level. Many other important recommendations of the report received very little, if any, attention in the nation's newspapers.

Industry reaction was generally critical of the subcommittee report, but the report did have the effect to reminding both industry and government of the rubber policy decisions that must be made in the months ahead.

Administrator W. Stuart Symington of Reconstruction Finance Corp. indicated in September that he will continue his efforts to frame a synthetic rubber plant disposal plan despite opposition in government to such disposal during the existing national emergency. He also let it be known that he has no intention to assume the role of "Rubber Czar" at this time.

Price Stabilizer Michael V. DiSalle informed Congress that the Capehart amendment to the Defense Production Act has brought the scheduling of dollars-and-cents ceilings on rubber products to a virtual standstill because the accounting required to set these ceilings would impose an almost impossible burden on industry and the OPS.

P. W. Litchfield, chairman of the board, Goodyear Tire & Rubber Co., again has urged that more synthetic rubber production capacity be provided in order to insure adequate rubber supply and stable markets in the present decade. This additional capacity may be obtained by a continuing program of plant modernization and some new construction, it was said.

General Services Administration announced September 25 that the price of natural rubber to the industry would remain at 52¢ a pound for #1 RSS through October.

Washington Report

By

ARTHUR J. KRAFT

NPA Rubber Controls

DPA during the last week of September was putting the finishing touches on a comprehensive review of rubber availability as the groundwork for up-to-date determinations of how much natural rubber should be made available to consumers in coming months (particularly the coming six months) and how much should be laid aside for the strategic stockpile.

Out of this study is expected to come a decision on whether the present stockpile target should be increased, decreased, or remain unchanged. The target, it is generally guessed, is in the neighborhood of 1,250,000 long tons.

The study was ordered by DPA Administrator Manly Fleichmann before the Senate Preparedness subcommittee issued its report early in September urging tighter restrictions on consumption to provide more natural rubber for the stockpile. While many assume that in light of the earlier study made by NPA for the Munitions Board the stockpile target will be lowered, this action is by no means certain in view of the opposition to dropping the target expressed by the Munitions Board. The NPA study indicated that satisfactory performance can be attained with military tires containing less natural rubber than provided in the cautious estimates last made by the Commerce Department's rubber division in 1947.

The Preparedness subcommittee noted that only 20% of the ultimate stockpile target was accumulated in the year since Korea, a rate of accumulation it considered too slow.

It is almost certain that even that rate was not maintained since June, and the Munitions Board has reported to the Senate Small Business rubber subcommittee that the stockpile goal will not be attained this year. Any revision in the stockpile target will not be made known publicly, but in evaluating the prospects for a reduction in the target or a change in the price-dictated tempo of stockpile buying, it is well to keep in mind the anxiety privately expressed by the military that civilian determinations on this program do not give adequate weight to military needs. Military officers talk of having a separate military stockpile of rubber—a store of rubber out of the reach of civilian administrators and uninfluenced by the General Services Administration's ideas on buying only when the price is right and the DPA's ideas of striking a balance between civilian and military requirements.

On August 29, Fleischmann and NPA Rubber Division Director Leland Spencer informed the Rubber Industry Advisory Committee that it is "considering a rubber distribution plan" based on the needs of individual companies rather than on base-period consumption.

NPA made no promises. It informed the industry that it would soon distribute forms upon which rubber consumers are to list their estimated needs for the first quarter of 1952. If the needs total no more that the estimated total availability, the companies will be allocated rubber on the basis of their requests.

"If the estimated requests are excessive," on the other hand, "the plan will not be used," NPA said.

NPA dropped a clew as to the prospects, on a purely statistical basis, of putting the plan into effect by disclosing that it expects 747,000 long tons of natural and synthetic rubber, including natural and synthetic latex, will be available for consumption in the first half of 1952. This figure includes rubber which will be used for military goods as well as civilian items. NPA further estimated that more than 60,000 tons will be used for military goods in the final quarter of this year of a total of 366,600 tons.

It would appear that the agency believes some 600,000 tons—more or less—will be available to the industry for civilian goods in the first half of the coming year, equal to the record rate of consumption registered in 1950. Some industry people feel that a realistic appraisal would show that rubber companies would be hard pressed to consume 747,000 tons in a half year, and that their estimated requirements will fall considerably short of that figure.

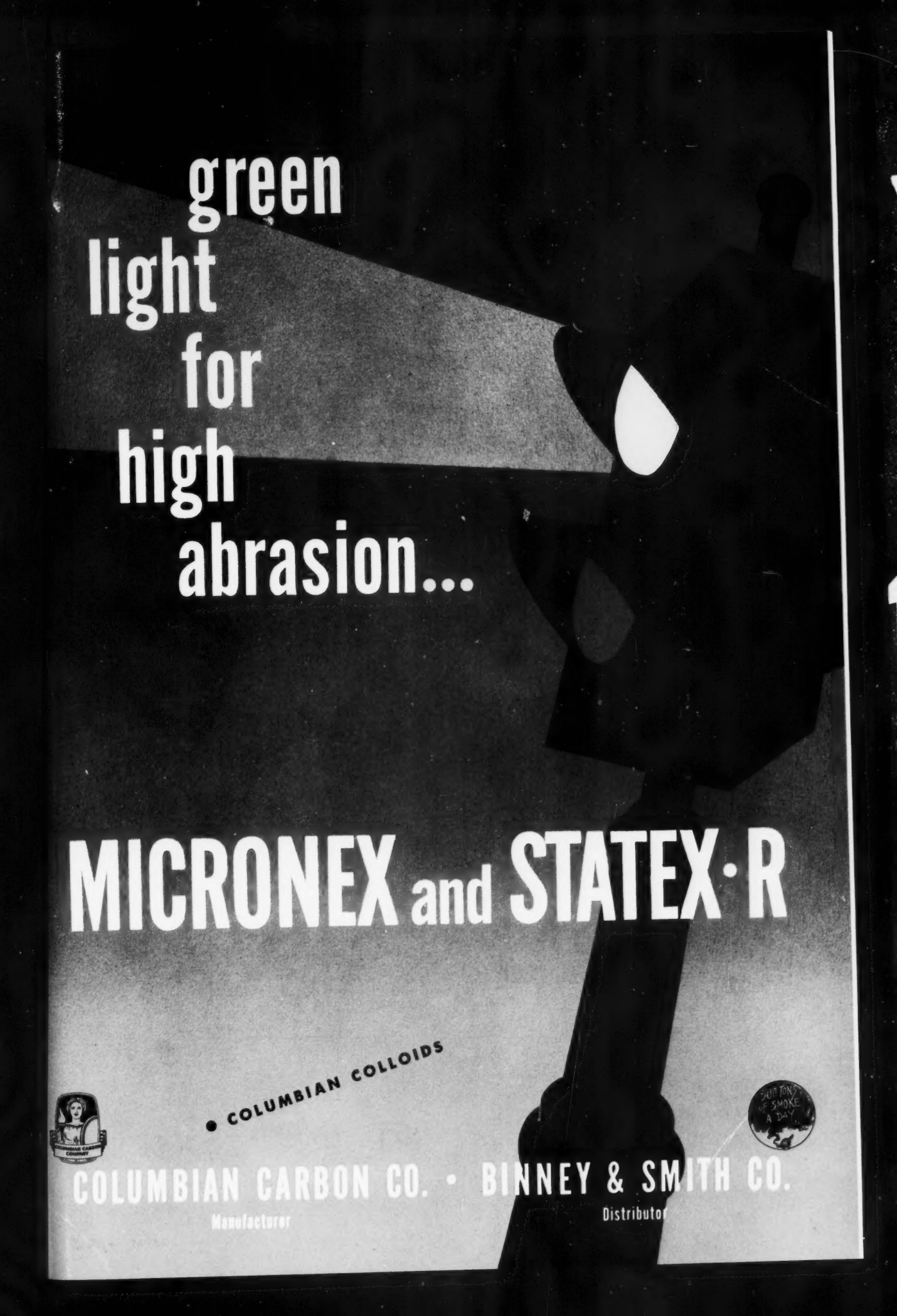
NPA is trying to ascertain the industry's capacity to use rubber by asking tire manufacturers for reports on their tire production capacities. These reports will be matched against industry requests and will be used to give DPA and NPA an accurate picture of what facility expansion may be needed to "bring production up to required levels," NPA explained.

At the August 29 meeting, NPA reviewed the revisons to Rubber Order M-2 issued that day and turned down suggestions that tire production restrictions be substantially eased.

The August 29 amendment to M-2, which took effect September 1, eliminated controls on the consumption of natural rubber latex; permitted manufacturers to carry a 60-day inventory of natural rubber and a 30-day inventory of GR-S. It also dropped controls on tire and tube inventories, simplified procedures for getting extra rubber to fill DO-MRO orders, simplified the requirement for maintaining high-level camelback production (but did not change the required level), and required manufacturers to hold to the natural rubber content specifications set out in Appendix A.

The last of these revisions was accomplished by eliminating the "escape clause" which permitted manufacturers—lacking enough synthetic rubber to consume at permitted levels—to substitute natural rubber regardless of the specifications listed in Appendix A. The abridgment of these specifications will no longer be permitted. NPA, however, simultaneously revised a number of these specifications—relaxing them substantially. For instance, passenger-car inner tubes can be made now with unlimited percentages of natural rubber, where previously only butyl tubes were provided for in Appendix A. The change was prompted, it was reported, by shortages of butyl rubber. Other specifications were eased in many categories, including some important mechanical goods items.

The new distribution plan previewed by government officials at the August 29 meet-


green
light
for
high
abrasion...
MICRONEX and STATEX·R
• COLUMBIAN COLLOIDS
COLUMBIAN CARBON CO. · BINNEY & SMITH CO.
Manufacturer
Distributor

MPC (Medium Processing Channel)

STANDARD MICRONEX

◆

EPC (Easy Processing Channel)

MICRONEX W-6

◆

HAF (High Abrasion Furnace)

STATEX-R

◆

FF (Fine Furnace)

STATEX-B

◆

FEF (Fast Extruding Furnace)

STATEX-M

◆

HMF (High Modulus Furnace)

STATEX-93

◆

SRF (Semi-Reinforcing Furnace)

FURNEX

◆

COLUMBIAN CARBON CO.
MANUFACTURER

BINNEY & SMITH CO.
DISTRIBUTOR

ing would retain specification controls as a keystone in the program to restrict consumption of natural rubber in order to make it available for stockpiling.

Turned down by NPA at this meeting was the suggestion of "one committee member" that the 90% of base period limitation on producing passenger-car tires be raised to 100%—in other words, dropping auto tires from Appendix B and putting their permitted production on the unlimited (as far as specific products are concerned) basis governing all but the relatively non-essential B products.

Also rejected was the suggestion of "another committee member" that tire manufacturers be permitted to produce a second-line tire selling for less than a first-line tire. A committee member—not identified by NPA—asked that manufacturers of replacement tires be permitted a higher rate of production to offset the advantage he charged accrued to manufacturers who supply an original equipment market diminished since the base period by restricted automobile output.

NPA informed the industry that other industries who use the same raw materials needed for rubber production will have their supplies increased. Further increases in these materials—notably styrene—for making more rubber will be deferred until the other industries, such as the polystyrene plastic manufacturing industry, can better fill their needs.

The Senate Small Business Committee on September 8 reported that the share of styrene production going to plastic molders "will be upped in the near future. Barring unforeseen circumstances, those molders using polystyrene should be materially assisted by an increase in basic styrene production and by a further reduction in the amount of styrene needed to produce synthetic rubber. Present indications, "the committee continued, "are that the supply of polystyrene molding powders should soon fill all the industry's demands."

The agency reported the following figures on rubber consumption. Total use of natural and synthetic rubber, including natural latex, was 296,500 long tons in the first quarter of 1951, rose to 313,200 tons in the second quarter, and is estimated at 350,900 tons in the third quarter and at 366,600 tons in the fourth quarter—a total for the year of 1,327,200 long tons, surpassing last year's previous record high of 1,258,000 tons.

As for civilian consumption, NPA reported it at 265,000 tons in the first quarter and estimated it would reach 303,100 tons in the fourth quarter. On the basis of these incomplete figures, only a rough guess can be made of how civilian consumption will compare this year with last years.

RFC Activities

Administrator Symington told a news conference September 12 that he will not drop his efforts to frame a plan for disposing of the government's synthetic rubber plants even though a "good many people in government are opposed" to releasing the plants while the country is mobilizing its defenses.

Asked whether the implied opposition of the Senate Preparedness subcommittee to disposal might alter his intention, Symington replied: "A good many people in Government are opposed to turning over the plants because this would be bad for the mobilization program. We in RFC think it would be just as bad not to look at a plan. I think we should see how it could be done. If we can't get a plan that will work, there's no point in talking about whether or not to dispose."

By the same token, he added, any decision to dispose of the plants would be rendered "academic" without an acceptable plan ready to implement it.

Symington announced in August that he and his nine-man Rubber Industry Advisory committee had begun studying the disposal question in an effort to draft a suitable plan. He said consideration would be given to disposing of all government plants, rather than a piecemeal approach. Symington's special assistant, Arthur Barrows, formerly a president of Sear-Roebuck & Co., is in charge of this work.

Symington also indicated that he has no plans to assume the role of "Rubber Czar" at this time. The Preparedness subcommittee, in its September 4 report on rubber, urged that the President's "expressed desire" that rubber purchases and operations be consolidated under RFC "should be carried out promptly." The President made known that desire in a letter to Symington, dated April 17.

The subcommittee also urged, "That a program for the most complete possible consolidation of all rubber functions in the RFC should be formulated and placed in effect as soon as possible." It contended that this "will eliminate much wasted motion and duplication and should result in a more coherent and efficient rubber program" as well as facilitate "the dealings of private persons with the government on rubber matters."

Asked about this recommendation, Symington said, "I see no need for us changing the way we're operating it [the rubber program] now."

He added that he and Jess Larson, in charge of procuring natural rubber for the stockpile and industry's current needs, "have always worked and will work in close harmony together." The RFC Administrator also took the occasion to deny emphatically a published report that RFC was investigating methods of taking over the rubber program without the sanction of an executive order from the President. Symington said that he, Larson, and Munitions Board Chairman John Small always consult each other before acting on rubber matters.

Queried on the Preparedness subcommittee's recommendation that RFC seek the expansion of butyl production facilities through the addition of plants to produce 30,000 to 50,000 tons a year, Symington said there is no agreement either in his staff or among his industry advisers as to whether "we need more butyl." He said there is division in both groups on the need of such expansion.

The Preparedness subcommittee referred to the long-standing dispute between RFC and The General Tire & Rubber Co. which has barred the use of General's process for increasing GR-S production by some 20%. While praising the Goodyear Company for making its process available to RFC, the subcommittee urged on General and RFC that they share a "prime duty to our country to reach a prompt agreement permitting the 'testing and use' of General's process.

"We urge the RFC to initiate actions," the subcommittee said, "necessary to resolve this situation. We trust that an agreement can be reached. . . ."

On September 6, Symington, Barrows, Production Director James Reid, and Rubber Reserve Director Gerald B. Hadlock met with President William O'Neil and Vice President L. A. McQueen, of General Tire. The following day General officials again presented their argument that RFC compensate the company for the use of its process in Government plants to the full nine-man Rubber Industry Advisory committee [of which General is not a member].

According to an RFC spokesman, General said that not all details of its process have been disclosed, and that it has something unique to offer. The spokesman said the company refused to disclose all details to RFC officials or the advisory committee. He indicated that there was no solution in sight for breaking the deadlock.

Synthetic Rubber Output

Production of butylenes and butylene butadiene, halted by fire damage on September 1, was resumed at the Borger, Tex., butadiene plant on September 17. Shipments to Gulf Coast plants for purification resumed September 24, RFC reported.

Production of GR-S is holding to the 760,000-ton annual rate reached earlier in the summer. Figures for July show total GR-S output of 64,454 tons, of which 24,479 tons were cold rubber and 2,201 tons GR-S latex. For August the official figures are 62,820 tons, including 23,927 of cold rubber and 2,481 of latex. On an annual basis cold rubber was being produced at a 280,000-ton rate and GR-S latex at a 30,000-ton rate.

Estimates of September and October output indicate no significant change from July and August either in total GRS output or the proportion being made as cold rubber. Latex output, however, is expected to rise perhaps several hundred tons above the August rate. Output of butyl was 5,407 tons in July and 5,680 in August, RFC reported, or somewhat below the yearly capacity rate of 80,000 tons.

GR-S Price Increase

Office of Rubber Reserve, RFC, through the Office of Price Stabilization raised its selling price for GR-S synthetic rubber 1½¢ a pound, effective with September deliveries. The increase was said to be necessary in order to maintain a break-even operation while boosting GR-S output from 760,000 to 860,000 long tons a year. The 100,000-ton expansion will require the use of alcohol butadiene, whose higher cost is reflected in a GR-S costing about 35¢ a pound to produce. The expansion will be completed "some time in 1952", according to RFC Administrator Symington.

Industry sources estimate that the latest increase in the selling price of GR-S will add about 16¢ to the cost of manufacturing a tire.

The price of GR-I, or butyl rubber, raised from 18.75 to 20.75¢ in November, 1950, was not changed. Both RFC and OPS argued that the 100,000-ton expansion of GR-S capacity might yield an overall saving in the cost of rubber to manufacturers since there will be more GR-S available to use in place of 52¢-a-pound natural rubber.

The Senate Armed Services Preparedness subcommittee expressed concern, however, that the use of more costly alcohol for making butadiene for the 100,000-ton GR-S expansion ultimately would adversely affect the competitive position of GR-S with natural rubber. Looking toward some future period of low-cost natural rubber, the subcommittee in its third report on the rubber program, added:

"It might later be necessary to use more drastic powers of specification to preserve the synthetic rubber industry."

The committee reported that of the 760,000 tons of current GR-S output, about 600,000 tons are made from petroleum butadiene and the balance from alcohol butadiene. The additional 100,000 tons of GR-S will come from alcohol butadiene capacity reactivated at Kobuta,

Pa., and Louisville, Ky. The subcommittee said the alternative is to construct additional petroleum butadiene facilities, since current capacity is in full use. It estimated the cost of erecting facilities to produce 75,000 tons a year of petroleum butadiene at $85 million, said it would take 18 months to build them, and noted such construction would require "a substantial tonnage of steel."

The GR-S price increases were authorized by OPS in Supplementary Regulation 57 to the General Ceiling Price Regulation, effective September 1. This regulation also fixed prices of the following types of GR-S latex at 27.75¢ a pound, dry weight, 1.5¢ a pound higher than previously: Grades 5, 6, 8, X-619, X-621, X-625, and X-653. Individual ceilings fixed for special types of GR-S produced by United States Rubber Co. at Naugatuck, Conn., are 27.25¢ a pound for GR-S X-278 SP and 0.75¢ a pound above the base selling price for all other solid GR-S.

OPS noted that the previous increase in the price of GR-S from 18.5¢ to 24.5¢ a pound was made to cover the cost of reactivating idle plants as well as the higher cost of production from alcohol. With the additional 100,000 tons, about 31% of the GR-S (266,600 tons of 860,000 tons) will be made from alcohol.

The ceilings established September 1 are f.o.b. point of production, to which the same delivery charges may be added as before—$1 per hundredweight in carload lots and $1.00 per cwt. for l.c.l. shipments.

OPS Actions

Price Stabilizer DiSalle informed Congress that the Capehart amendment to the Defense Production Act will bar rollbacks in the prices of rubber products until the government goes through a "long and involved" accounting procedure to determine the direct and indirect costs of manufacturing the many thousands of items made by the industry.

He made the statement in appearing before the Senate Banking and Currency Committee, August 30, with an appeal for the elimination of the Capehart amendment from the Defense Act. DiSalle said the requirements of this amendment are almost impossible to fulfill, and that the scheduled drafting of dollars-and-cents ceilings for manufacturers has been brought to a standstill as a consequence.

Complaining of the barrier put in the way of bringing down rubber product prices to reflect the 16¢-a-pound reduction in the cost of natural rubber to industry which took effect July 1, DiSalle had the following to say:

"Last year, crude rubber was bid up drastically in the world market. It has come down substantially, but the trade expects it to come down much further—perhaps to half its present price. That would bring the raw material costs for manufacturers of rubber products far below the level of last January and February [the Capehart amendment prohibits rollbacks below January-February, 1951, levels —Editor]. But there is little likelihood that actual prices for rubber products would automatically reflect the drop in raw material costs. Even in such extreme cases there can be no rollback until we have gone through the long and involved accounting procedure I described a few minutes ago."

(DiSalle went to considerable length to describe what he called the unanimous opinion of industry cost accountants that the accounting required to set ceilings under the Capehart amendment would impose an almost insuperable burden on industry and the OPS. His written statement, in covering this feature, drew heavily upon an analysis made of cost accounting in the rubber mechanical goods industry by Charles Halligan, of The Rubber Manufacturers Association, Inc.).

OPS rubber branch officials confirmed that pricing activity for rubber products has been at a virtual standstill since the Defense Act was extended with the Capehart amendment. Queried by tire and tube manufacturers as to whether the 1½¢ boost in the price of GR-S put into effect September 1 will be passed on in higher ceilings for their products, OPS said no revisions of ceilings under the manufacturers price ceiling order, CPR 22, are being contemplated at this time. OPS is still attempting to draft regulations applying the Capehart requirements to CPR 22 and similar regulations for manufacturers, while conducting its campaign to have this amendment repealed by Congress.

Ingle Leaves GSA

John B. Ingle, director of the government's exclusive natural rubber buying program, left his post on September 17 on an indefinite leave of absence.

A spokesman for GSA said Ingle plans to return "in one to two months." He took leave to attend to personal matters, GCA declared.

During Ingle's absence, his post will be filled by George Casto, now deputy director of the rubber division of GSA's Emergency Procurement Section, the agency said.

Ingle joined GSA last January, shortly after that agency took over exclusive buying of natural rubber for industry and the government's strategic stockpile.

Johnson Preparedness Subcommittee Report

The Senate Armed Services Preparedness subcommittee on rubber, on September 4, issued its third report on rubber, a 48-page document criticizing the slowness of the government in adding natural rubber to its stockpile and calling for tighter limitations on consumption in order to make more natural rubber available for the stockpile.

The report was months in the writing; the last previous report of the subcommittee dealing with the national rubber policy came on November 24, 1950. Many of the facts marshalled by the subcommittee to buttress its conclusions dealt with events weeks and even months old. Many more recent developments, including the apparent improvement in overall rubber supply, were not reached in this review of the rubber situation.

Nevertheless, since the report dealt with continually developing facets of national rubber policies, its conclusions, both stated and inferred, are of current significance. These statements and conclusions are:

The nation's progress in attaining its stockpile goal has been too slow. The impetus behind the aggressive stockpiling program fell off in April, when DPA and NPA, under pressure from the rubber industry, diverted natural rubber destined for the stockpile to consumer channels.

The report had no quarrel about the need at the time to boost truck and farm implement and tractor tire output, but did not approve of putting industry's demands ahead of the stockpile—certainly on a continuing basis. The report made no mention of the pressure exerted on NPA to provide more rubber to smaller manufacturers by the Senate Small Business rubber subcommittee, headed by Sen. Guy Gillette (D., Ia.). In its only reference to this subcommittee, the report commended "its realistic efforts to increase participation of medium and small business in the rubber program."

The report recommended that the stockpiling rate be accelerated, that is restored to the more rapid rate agreed upon in the Fall of 1950, chiefly by imposing tighter restrictions on natural rubber use. Specifically recommended were further limitations on the natural rubber content of passenger-car tires, greater elimination of less essential rubber products, tighter specifications to assure the best use of the limited amount of natural rubber available for consumers, strengthening regulations to channel more rubber materials into essential civilian products.

A conclusion not specifically stated as such, but plainly evident (a subsequent check showed this inference valid) was that the Preparedness group is against disposing of the government's synthetic rubber facilities under present conditions of rubber preparedness and the threat of war. This attitude could be the tip off on how things will stand if industry or the Administration asks for a disposal program when the Rubber Act comes up for renewal next year.

Another recommendation was prompt consolidation "to the maximum extent feasible of all responsibilities and operations of the national rubber program under the RFC." The report boosted the contributions of RFC Administrator Symington, GSA Administrator Larson, Munitions Board Chairman Small and expressed hope that DPA and NPA Administrator Fleischmann will prove the tough-minded administrator necessary to reverse the depredations it sees being made on the rubber supply by the industry. Small got the strongest accolade for his continuing fight, despite the April setback, for an aggressive stockpiling policy. The recommendation to give the coordinator's job to Symington was tied to the President's letter of last April expressing his desire that Symington consolidate rubber purchases and operations under RFC.

The subcommittee recommended "efforts to attain maximum production from all synthetic rubber facilities through removal of in-plant bottlenecks; feasible 'within wall' steps to increase production and development of processes to increase the mass of rubber materials without substantial expansion or impact upon scarce component materials."

On this subject, the report covered the raw material situation extensively as well as recent research in GR-S extenders and other methods of increasing supply, such as cutting down reactor time in processing GR-S. It praised the decision to expand GR-S output to 860,000 tons a year and said the subcommittee is "convinced that we must become free from dependency on natural rubber to the fullest extent and as soon as possible . . . . expansion in existing capacity is . . . . necessary." While the report called for plant construction immediately to add another 30,000 to 50,000 tons of butyl capacity, it made no recommendation on building additional GR-S copolymer plants. It weighed the issue of whether to attain the planned 100,000-ton GR-S production increase by using alcohol butadiene capacity already in existence or building a 75,000-ton capacity petroleum butadiene plant. The latter would mean a less costly GR-S, but takes time, money, and scarce steel. Alcohol butadiene as a base might injure the "ultimate competitive position" of GR-S with natural rubber, possibly requiring later on the "use of more drastic powers of specification to preserve the industry." The report reviewed RFC's program for acquiring the alcohol to feed its reactivated butadiene facilities and urged planning now

to get the domestic alcoholic beverage industry lined up to make a contribution next year. The final decision on petroleum vs. alcohol butadiene, it said, is up to RFC, but it urged as the "paramount consideration" the nation's security "with special emphasis on the desirability of preserving the synthetic rubber industry by keeping it competitive with the natural rubber industry"—a vote for petroleum-butadiene plant construction.

On styrene, it noted that this material was in short supply and that constant efforts must be made to provide for both the rubber industry's needs and those of other industries (plastics). RFC's progress in cutting down the styrene required per pound of GR-S was given full recognition. As for benzene, the report, furthermore, noted the major hope for increased supplies are in current expansion plans of the petroleum industry. It promised to watchdog benzene output to make sure this expansion program does not lag.

In addition to calling upon RFC to plan to build another butyl plant (the subcommittee is ready to sponsor legislation to grant construction authority for a government plant), the report also recommended construction of new isoprene producing facilities. The subcommittee said it would check with the companies involved to clear bottlenecks to expand output of neoprene and nitrile type rubber.

[The subcommittee's recommendation and views on the General Tire and the Goodyear rubber extender processes are noted elsewhere in these pages.]

Other recommendations are:

Aggressive research programs to develop synthetic rubbers as good as natural rubber for all important uses; further emphasis on programs to increase natural rubber output here and in Latin America, the latter with the cooperation of the other Western Hemisphere nations; vigorous enforcement by friendly nations of recent actions to reduce the flow of natural rubber to the Communist sphere; cooperative development of plans to exchange our synthetic for natural rubber with friendly nations as soon as we have an exportable surplus of synthetics; steps to prevent excessive exports of scrap rubber from this country; continuation of public purchase of natural rubber as long as it is needed for the stockpile.

The report gave special notice to the value of reclaimed rubber to national security and recognized the substantial expansion in reclaim output over recent months.

It saw more hope of quick results in boosting natural rubber output in this hemisphere by putting more stress on *krimsaghyz* and guayule than in expanding even the blight-resistant *Hevea* transplanted from the Far East to Latin America. It wants the nation to be ready to go into large-scale domestic natural rubber production if war comes.

Stating that friendly foreign nations (the NATO countries) should not look to our stockpile for natural rubber in event of war, the report urged creation of an international pool of natural rubber in which each nation would have a call in proportion to its contribution. It supported the decision of Allied authorities to permit expansion of synthetic rubber production in Western Germany and urged construction of synthetic rubber facilities in other nations less likely of invasion. It urged, moreover, joint U. S.-Canadian action to channel Canadian rubber goods manufacturers the natural and the synthetic rubber they need to boost Canadian output of rubber items to fill the military needs of other NATO allies.

On continuation of public purchasing of natural rubber, the report was not clear on whether the subcommittee favors continued exclusive government buying beyond the achievement of the stockpile target. It spoke of public purchase coupled with expanded GR-S output and adequate conservation measures as steps which remain necessary "in the curbing of inflation and lowering the cost of the stockpiling program to the taxpayer."

The subcommittee said exclusive public purchasing has been an important factor in getting the natural rubber price down while our stockpiling demands have spurred greater output of natural rubber. It expects natural rubber prices to fall further when our synthetic rubber output hits capacity provided we maintain reasonable restrictions on consumption.

The third report on rubber was probably the least succinctly written and edited of the 121 reports churned out by the Preparedness subcommittee in the 13 months since it began to sit as watchdog over the preparedness program. The report was released over the Labor Day holiday, and few took the trouble of giving it the thorough study it needed. Government experts who might have cleared up some of the resulting confusion were not supplied with copies.

The report backfired, with its main theme of curbing consumption of natural rubber to make more available for stockpiling obscured. The headline captivating language which has become a trade mark of the subcommittee's report was pretty much confined to stressing the inadequacy of the stockpiling record instead of the Senators' solution for it.

The aftermath was a wild jump in natural rubber prices that took all the resources of the government's press agents to talk down. Left in the wake of the report and the subsequent clarifying statements was a general conviction that the Preparedness subcommittee, diving in after nine months of silence on rubber policy, only muddied the water for other swimmers.

The Singapore market, already dangling above the reach of price-conscious stockpile buyers, spurted 8¢ by September 10. For several days there was official silence. Then came several official statements from Johnson and Larson calculated to undo the damage. They succeeded to the extent of knocking down the market from 57.36¢ C & F New York spot on September 10 to 54.56¢ two days later and to 51.36¢ on September 13. When speculative selling ran its course, however, the market rested several cents above the level prevailing prior to the Preparedness subcommittee's report.

What factors were responsible for the rise became a special study of the subcommittee in mid-September. Subcommittee Chairman Lyndon B. Johnson (D., Tex.) was prepared on September 13 to make a Senate speech reaffirming the unanimity of himself, GSA, and RFC on the need of speeding up stockpile purchasing, but not by paying higher prices demanded at Singapore to do it. It could be done. Johnson was ready to restate, by tightening restrictions on civilian consumption and increasing production and use of synthetics.

The speech was successively deferred through the early days of the following week while the subcommittee sought to determine the precise nature of the influences at work in Singapore. The speech was then abandoned, with some indication that the Senator might yet take the floor if and when he could pin point a statement at Singapore to take the air out of inflated rubber prices.

The subcommittee disclaimed responsibility for starting the market moving upward. It contended that a careful reading of its report would adduce no interpretation that it was calling for a "wild buying spree"—but only that it urged the government agencies concerned to put a larger share of the supply available to stockpile buyers into to the stockpile and give less to industry.

Two other factors have been reported active in the Singapore market and possibly responsible for the bullish market. One was the apparent anticipation of increased Russian purchases and, the other, the apparent downtrend in production of natural rubber. At this time much less is known about the statistical position current at Singapore or anticipated in coming months, beyond the fact that a tightening of supply apparently is a prominent factor in the calculations of some traders.

The *Washington Post*, which speaks with considerable authority in this city, expressed its editorial view September 19. It deplored the "hysteria" aroused over our rubber preparedness position by the Johnson report and called for a fresh evaluation of our position—in light of technological developments since the last war with synthetics—by a commission similar to the Baruch committee of World War II. It studiously avoided taking sides with either industry or the Johnson committee on whether we are over- or under-preparing now, but did affirm its belief that the DPA should not be divested of its current role of determining how much rubber goes to industry and how much to the stockpile reserve.

The theme of the Johnson report and its repercussions may prompt another effort within a few months at working out an international agreement on rubber. The efforts made in February and April were aimed at international allocation, with price a secondary factor, and were intended to cover all major rubber producing countries.

The best guess here is that a new effort will have less ambitious objectives although scarcely less urgent ones. Price stability might be the prime objective, and an effort to cover such countries as Ceylon and Indonesia may be abandoned. Both of these countries are less amenable to a long-range agreement with consuming countries, and Ceylon has about given up rubber as a key factor in its future economy. Indonesia, on the other hand, presents other difficulties including an unstable currency and lack of internal discipline.

Other Industry News

Litchfield Again Urges More Synthetic

In another issue of his "Notes on America's Rubber Industry," this one entitled "The Free World Looks to America for Synthetic Rubber" and distributed a little more than two months afbter his last issue of June 30, Litchfield of Goodyear early in September urged modernization of existing synthetic rubber plants and the construction of new petroleum butadiene facilities equal in capacity to existing alcohol butadiene plants.

World consumption of rubber will exceed available supply 10 years hence, Litchfield warns, and unless synthetic production in this country is increased considerably, a shortage of 500,000 tons of rubber could develop by that time.

Alcohol as a source of butadiene for synthetic rubber continues to be uneconomical and should be replaced by petroleum while

the alcohol butadiene plants are placed in inactive reserve, it was said. While the two types of GR-S are identical, the cost of the rubber produced from alcohol butadiene is 25¢ a pound higher than that produced from petroleum butadiene. Under present conditions the cost of the new construction would be easily and rather quickly self-liquidating. Furthermore, Litchfield added, these new and modern plants would be attractive to potential purchasers when the time comes for the government to get out of the rubber business and sell or lease its synthetic plants to private operators; whereas high-cost alcohol plants could never hope to attract private capital.

More synthetic rubber can be obtained from existing plants by virtue of a method whereby cycle time of the blending operation of butadiene and styrene can be reduced as much as 50%, Litchfield said. Assuming that the resultant product passes qualitative tests, this means that the output of existing reactors can be stepped up to produce 50% more synthetic rubber, and he urged that we get our plant modernization planning, including quality testing, under way without further delay. (The above-mentioned method for reducing cycle time refers to the ability to use a more highly activated formula by employing auxiliary cooling coils and effective short stopping agents.—EDITOR.)

"In the event of a major war, America and the free world would have need for vastly more than the capacity of now existing synthetic plants to provide for military and associated need," Litchfield wrote.

"Without war, there is probably a normal economy need for half a million long tons additional rubber production annually by 1960. This demand will be building up gradually during the interim.

"Hence, the long term trend is for shortages to continue in the natural rubber market even though temporary relief may and probably will come at intervals during the long term. Under this prevailing influence, the long term market price of natural rubber will continue bullish," he continued.

Litchfield said that he realized that the additional plant capacity recommended will not be fully utilized during the entire period of time under consideration since when the United States completes it stockpiling program, the total supply of rubber will immediately be in excess of the market. But the lull will be temporary, he added, and demand will progressively catch up and pass supply, and unless we are prepared, the inevitable squeeze on the consumers of rubber products will return with full vigor and cost.

"My concern is that these temporary lulls will tend to divert our attention from the long term needs of our economy and from the dangers of inadequate rubber supply in time of war or emergency. We simply cannot afford to lose sight of 1960," Litchfield emphasized.

It is apparent that the objective here outlined, in its initial stages at least, will call for joint action on the part of private industry and government, Litchfield believes.

"The synthetic industry was built on just such a partnership," he continues. "Fundamentally it is in conflict with American traditions of business operation but it was a matter of stern necessity in time of great crisis.

"No one will seriously disagree with the proposition that the government eventually should get out of the rubber industry. The big question is when. *In the eventual dissolution of this partnership, however, let us be sure that we do not miss the twin objectives of adequate supply and stable markets and wind up with a chaotic and dangerous situation on our hands.*" Litchfield concluded. (Italics are Litchfield's.—EDITOR.)

Industry Reaction to Johnson Report

General industry reaction to the report of the Senate Armed Services Preparedness subcommittee issued on September 4 asking for more restrictions on the use of natural rubber in order to increase more rapidly our inadequate stockpile was that the stockpile was ample in size and that no shortage of rubber would be likely to develop, even in the event of a major war.

Although the size of the natural rubber stockpile is a secret, industry sources estimated it at about 750,000 long tons at the present time, stating that this figure was arrived at from the monthly figures published by the U. S. Department of Commerce.

With the present rate of natural rubber imports and current consumption, the government stockpile could top a million tons by early 1952. Synthetic rubber production of all types is likely to reach a level of a million tons a year in 1952, and with 42,000 tons a month of natural rubber (including latex) now being made available to industry, more rubber will be available than the industry has the capacity to use. It has been estimated that if the industry worked a seven-day week in the immediate future, its capacity to consume new rubber would not exceed 120,000 tons a month.

The indicated excess of supply over current requirements for new rubber is contrary to the implications of the Preparedness subcommittee's report. Many rubber goods manufacturers are also reluctant to increase the capacity of their plants since they have no way of telling if the added facilities would be needed in the immediate future. More capacity for the production of truck and bus-type tires might be used, but some passenger-car tire capacity is not being used at present.

Another industry spokesman made the point that in the event of a major war it would be steel, copper, aluminum, and other such materials that would be in shorter supply than rubber.

Industry Outlook

Joseph A. Hoban, general manager, tire merchandising, The B. F. Goodrich Co., in a talk before the Sales Executive Club of Cleveland, O., last month, stated that hard selling days postponed for a year by the crisis in the Far East, are about to return to the rubber industry. He said the industry had rested in a comfortable, post-war sellers' market longer than almost any other industry, but explained that production is now catching up with demand.

The Goodrich official also told the sales executives that when a sellers' market switches into a buyers' market, it is not enough to say "we are going back to work" and let it go at that.

"New appeals, new ideas, and new products are needed to keep sales up and to stimulate enthusiasm of salesmen."

Some of the efforts being used by the Goodrich company to "reactivate" its sales force were described. Among other factors outlined by Hoban which would affect sales planning in the years immediately ahead were these: By 1960 there will be many more consumers (young and old age groups) and only a few more producers; metropolitan areas are growing while farm population is shrinking; suburban populations are growing rapidly while cities are growing very slowly; some parts of the country, such as the West Coast and the Southwest are growing much faster than others.

Another Goodrich official, Vice President James J. Newman, told the Kansas City Chamber of Commerce on September 19 that the tremendous postwar increase in passenger cars, trucks and buses—which brought the automotive population to 45 million at the end of 1950—has outpaced by far the increase in the mileage and quality of the nation's highways.

"Looking ahead, we estimate that by the end of 1960 there will be 65 million passenger cars and trucks on the roads of the nation and five million farm tractors in service. These estimates would naturally be set back if we are unfortunate enough to become involved in a world war," Newman said.

Labor News

Goodyear and the United Rubber Workers of America, CIO, signed a wage increase agreement on August 28, providing for a wage increase of 13¢ an hour for about 30,000 workers in 10 plants of the company. All the Big Four rubber companies during the months of August and September have agreed to an increase of 13¢ an hour for their employes, and many other companies have granted similar raises. Employes of Sun Rubber Co. were granted a 13¢-an-hour wage rise on September 17. About 8¢ of the 13¢ of this wage increase will require approval by the Wage Stabilization Board. It has been estimated that if the full 13¢ increase is approved, the payroll of the rubber industry will be increased by about $75,000,000.

A wildcat strike in the shipping and transportation department of the Goodrich plant at Akron, O., idled almost 10,000 workers for about a week in late August. Production was resumed on August 29 after a meeting between company and union representatives asked for by Goodrich Vice President T. G. Graham, in which he charged that the union had failed to take adequate steps to get the strikers back to work. Other work stoppages, this time by stock preparation department employes, reclaim department employes, and also chemical department employes at the same Goodrich plant, interfered with production during the week of September 10.

A one-day strike occurred at the Akron plant of the Firestone Tire & Rubber Co. on September 6 when workers supplying stock and beads to tire builders walked out.

About 4,300 employes at the U. S. Rubber plant in Mishawaka, Ind., went on strike on September 17 as a result of a breakdown of negotiations over a supplemental contract to the master agreement reached on a company-wide basis early in September between company and URWA.

Resistoflex Corp., Belleville, N. J., has elected Alexander N. T. St. John as vice president in charge of planning and development. Mr. St. John, who has been technical director and research engineer for Resistoflex, will continue to be actively engaged in technical development with the various groups of the Military Services. Prior to this present association, Mr. St. John served with the Civil Aeronautics Board, held the rank of major, ATC, AMEW, during World War II, and also was associated with or acted as consulting engineer to a number of the aeronautical companies.

Resistoflex also announced the promotion of Irving D. Press to chief engineer, and Benajmin M. Walker to chief chemist.

NEWS ABOUT PEOPLE

Frederick E. Traflet

Frederick E. Traflet was elected vice president—sales and research—and a director of Pequanoc Rubber Co., Butler, N. J., at a board meeting September 19. Mr. Traflet, in the rubber industry 32 years, joined Pequanoc in 1923 as chief chemist. He resigned from the company as vice president in 1948 owing to ill health, but returned in 1950 as director of sales and research.

C. E. Wilson is now plant manager of Pacific Molded Products Co., 905 E. 59th St., Los Angeles 1, Calif. He formerly operated Golden State Rubber State Rubber Mills and had also been with the parent company, American Radiator Specialties, in the Carolinas.

Robert E. Rulison has been appointed district sales manager for Illinois, Indiana, Wisconsin and Minnesota for Baker Castor Oil Co., 120 Broadway, New York 5, N. Y. His headquarters are at 105 W. Adams St., Chicago, Ill. Mr. Rulison, with Baker since 1941, has served as traffic manager, assistant sales manager responsible for Castung sales, and as sales representative for New Jersey and later for New York State.

Chris Kurzweil has been elected vice president in charge of manufacturing at Mystik Adhesive Products, 2635 N. Kildare Ave., Chicago 39, Ill.

Howard Lein, of H. C. Lein Rubber Co., 1171 E. 63rd St., Los Angeles 1, Calif., has sold his foam rubber operation. Co-Ed Specialties bought a large part of the equipment, and the remainder was purchased by others in the custom foam molding trade.

Tom Mathews, who for a number of years has been engaged in industrial processing and high-temperature work as well as rubber research throughout the Midwest, has joined the staff of J. O. Ross Engineering Corp., as a sales engineer in the Detroit office.

Fred H. Mason has joined the technical staff of General Latex & Chemical Corp., 666 Main St., Cambridge 39, Mass. He was formerly with Toyad Corp., Latrobe, Pa., where he was chief chemist of the foam rubber production facilities. Prior to that Mr. Mason had been in the engineering laboratories of Firestone Tire & Rubber Co., where he carried out pioneering work on high-frequency heating and curing of rubber, especially foam rubber.

Hansen-Cambridge

Fred H. Mason

Floyd L. Price, formerly with Brunswick-Balke-Collender Co. and United States Rubber Co., is now rubber technologist at W. J. Voit Rubber Corp., 1600 E. 25th St., Los Angeles 11, Calif.

Frederick W. Partridge has been appointed sales representative in the athletic goods division, Seamless Rubber Co., New Haven, Conn. With headquarters in Philadelphia, Pa., he will cover the Middle Atlantic States.

James F. Eversole has been appointed manager of research administration of Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y., and will help coordinate the research activities of all the corporation laboratories where basic research and development work are being done on alloys, chemicals, gases, carbons, and plastics. Dr. Eversole joined the chemical research organization of the corporation as a research chemist in 1929; several years later was assigned to the laboratories of Linde Air Products Co., a division of Union Carbide; and in 1944 was appointed superintendent of Linde's laboratories at Tonawanda, N. Y.

A. F. Reznicek has become a consultant to the rubber and associated industries on sales engineering problems such as application, design, and development of specifications for compounding, processing, and manufacture of rubber products. His company is called Rubber Products Engineering and is located at 108 E. 4th S. Los Angeles, Calif. He gained his experience with Gates Rubber Co., Firestone Tire & Rubber Co., and W. J. Voit Rubber Corp.

C. F. Fryling, a leader in the development of cold rubber, has joined the research department of Koppers Co., Inc., Pittsburgh, Pa., and will supervise special research projects of a pioneering nature for Koppers. Dr. Fryling entered industrial research work with General Electric Co. and in 1926 joined Combustion Utilities Corp. where he conducted research on the oxidation of lower paraffin hydrocarbons. Then from 1931 to 1936 he was senior chemist with the geochemical section of the Illinois State Geological survey. From 1937 to 1944 he served as a research chemist for The B. F. Goodrich Co., where he was associated with the group that developed Hycar synthetic rubber. From 1944 to 1945 he was assistant director, copolymer research in the Office of the Rubber Director. Then in 1945, Dr. Fryling became supervisor of polymerization research for Phillips Petroleum Co., where a large portion of his work consisted in development of the cold rubber process. He holds numerous patents, particularly relating to synthetic rubber.

C. F. Fryling

Charles Kuchar is now chemist and purchasing agent at Master Processing Corp., Lynwood, Calif. He was formerly employed by Goodyear Tire & Rubber Co. of California. **C. Peters** is also returning to Master Processing Corp.

Warren B. Beckler has been made vice-president in charge of manufacturing for Brown Corp., Boston, Mass., manufacturer of wood pulp, paper and allied products. Mr. Beckler was works manager of the LaTuque sulphate pulp mill since 1942, after having served successively as chemical engineer, chief chemist, operating chemical engineer in charge of the mill's bleachery, then assistant superintendent, and superintendent. Upon returning from overseas service with the U. S. Army in World War I, he had joined the research department of Brown Co., Berlin, N. H., in 1919. Early in 1921, he was transferred to Brown Corp.'s Kraft Mill at LaTuque, P.Q., Canada, where he recently completed 30 years' service. As vice president in charge of manufacturing Mr. Beckler is also in general charge of the rehabilitation of the Brown Corp. at LaTuque.

EAST

New HAF Black Plant

United Carbon Co., Inc., Charleston, W. Va., is augmenting its furnace process carbon black producing facilities by erecting a new plant costing more than $2,000,000 in southern Louisiana. The plant will be located on the Southern Pacific Railway some 15 miles west of Franklin, La., and will produce oil-base furnace black of the HAF high abrasion type. Expected to be in operation shortly after the first of the year, the plant will produce at an annual rate in excess of 30,000,000 pounds. The plant will embody United's latest engineering developments in furnace black manufacture.

In January, 1951, United announced the construction of a new plant at Norrick, Tex. Two units of this plant, producing SRF and HMF blacks, have been in production for some time, and the third unit is expected to go into operation this month.

To Form Dealer Council

Fremont Rubber Co., Fremont, O., scheduled its first regional distributers' meeting at the plant September 17 to 19. Eight distributers, representing outstanding districts in the country, were invited to the meeting, the first effort to form a distributers' council which will be part of the Fremont sales - merchandising - advertising program in the future. Each year the representatives on the council will be rotated.

The entire merchandising program as well as the advertising program for 1952, new selling techniques, and new products were discussed. W. C. Gilbertson, vice president in charge of sales, served as chairman for the meeting; Robert P. Johnson, chairman of the Fremont board, addressed the group on company policies; Eldon Frazier, vice president in charge of research and development, introduced new products; while A. E. Gross, of Beeson-Faller-Reichert Advertising Agency, handled the advertising discussion.

Events during the three-day visit included a trip through the Fremont plant as well as an all-day fishing trip on Lake Erie.

Southern Latex Corp., Austell, Ga., has acquired from Testworth Laboratories, Inc., compounding equipment in its Dalton, Ga., plant, which equipment Southern Latex will install in its plant. The Dalton property of Testworth Laboratories will be used exclusively as a warehouse and distribution point for products manufactured in the Testworth main plant, Columbia City, Ind.

E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., has formed an organization planning division within the employe relations department to inaugurate a sound program to insure availability of sufficient competent, well-trained personnel to fill future managerial openings. W. Laird Stabler, manager of the personnel and industrial relations division of the rayon department for six years, is head of the new division. His successor in rayon is Wm. R. Creadick, assistant director of the office buildings department.

Heater Cuts Costs

General Electric Co., Schenectady, N. Y., has announced that one of its five-kilowatt induction heaters has been used by Sponge Rubber Products Co. to cut by more than 90% the cost of reclaiming valuable metal strips from rejected weather stripping. The process of making the weather stripping by adhering sponge rubber to metal strips has a reject rate of 20-30%. Reclaiming the metal from these rejected pieces was formerly done by soaking the strips in a solvent to swell and soften the rubber, then peeling off the rubber by hand. This procedure was costly and time consuming, in addition to presenting a hazard through the use of toxic and inflammable solvents. In the new set-up the rejected strips are placed on a continuous conveyer belt, and pass through an inductor coil connected to the G-E heater, and are immediately stripped by a gloved workman. The heater processes nearly 6,000 strips in a six- to seven-hour day.

Personnel Changes

T. G. Thompson, of the chemical division, has been appointed supervisor of costs for the phenolic products plant at Pittsfield, Mass. Mr. Thompson joined General Electric in 1928 as a trainee in the business training course at Schenectady; in October, 1934, became cost clerk for the plastics department; from March, 1937, to July, 1942, was an accounting clerk for the department; then he was transferred to accounting cost and payroll at the Taunton, Mass., plant; in July, 1948, he returned to Pittsfield and assumed responsibilities in the general cost section; and a year later came to the phenolic products cost section.

Two chemical engineers have joined the process development laboratory of the chemical division: Robert L. Hatch, a chemical engineer with the Standard Oil Co. (Indiana) for three years, and Stanley Seltzer, a teaching fellow in the Department of Chemical and Metallurgical Engineering at the University of Michigan for two years.

The process development laboratory develops new chemical and mechanical processes for the eight plants of the chemical division and is located at division headquarters at Pittsfield, Mass.

The C. P. Hall Co., manufacturer of chemicals for the rubber industry, is celebrating its thirty-second anniversary. The firm, which started in 1919 with one small office, now has four plants, at Akron, O., Los Angeles, Calif., Chicago, Ill., and Newark, N. J.

New facilities have been added by C. P. Hall Co. to its Chicago plant to increase output of esters, plasticizers, emulsifiers, surface-active agents, etc., for use in the rubber, plastics, paper, cosmetic, food, and other industries. This group of chemicals includes the mono- and di-stearates; oleates, ricinoleates, etc., of ethylene glycol; glycerine; polyoxethylene; propylene glycol; butoxyethyl; and others. Joseph E. Stonis, with more than 20 years of experience in this field, has been appointed head of the new manufacturing division, and the entire sales personnel of the company have been schooled to handle this line of products. Laboratory facilities for product quality control and customer technical service are already in operation.

New Sales Engineers

B. H. Davis, secretary and sales manager for The Standard Machinery Co., Mystic, Conn., has announced the appointment of two sales engineers, Ralph B. Symons and William A. Shilling.

Mr. Symons for 11 years was with Dunlop Tire & Rubber Goods Co., Ltd., and Canada Wire & Cable Co., Ltd., in Canada. In the United States he has served Firestone Tire & Rubber Co. and Wilmington Chemical Corp. and for some time has been a consulting engineer for the rubber and the plastics industries. He will cover New England territory for Standard, except for western Connecticut.

Mr. Shilling has been with Carboloy Co., in Detroit, and was with the Armed Services for two years in World War II. Since that time, he has specialized in equipment for the rubber and the plastics industries. He will travel western Connecticut, New York, and New Jersey for Standard.

Vice President John R. Wheeler, of Standard Machinery later announced the addition of two engineers to the firm's design department.

Henry Eickhoff was graduated with an M.F. degree from Maschinenbau-Schule (College), Fiberfeld, Germany, and came to the United States in 1923. Since that time he has had extensive successful engineering and production experience as a tool designer and as chief engineer on automatic machinery design. During World War II he contributed valuable assistance to the war production effort in many confidential posts.

Walter F. Fanning received his mechanical engineering training at Rhode Island School of Design and at Brown University. His experience has included designing and tooling for automatic rifles and many items of a precision nature for ordnance requirements.

Davison Chemical Corp., Baltimore 3, Md., has contracted with Rubber Reserve to produce a tantala-silica gel catalyst used in the manufacture of butadiene from ethyl alcohol and acetaldehyde. The catalyst will be delivered to Koppers Co. and Carbide & Carbon Chemical Co., who produce butadiene under the government rubber program. In the process, ethyl alcohol is mixed with acetaldehyde, and the mixture passed over the catalyst to form butadiene and various by-products. The overall yield of butadiene is 60-64% of the theoretical yield. The catalyst is 2% tantalum pentoxide and 98% silica gel; the latter component is used for the condensation of acetaldehyde to crotonaldehyde, an intermediate product reduced to butadiene by the tantala in the catalyst with the ethyl alcohol acting as a hydrogen donor.

Sharples Chemicals, Inc., 123 S. Broad St., Philadelphia 9, Pa., last month announced the following assignments in its sales department: E. N. Sidoroff, from the New York sales office to chemical products manager, executive offices, Philadelphia; W. G. Kayser, senior salesman, New York, to regional sales manager with headquarters in New York; T. C. Dabovich, from senior salesman, Chicago, to regional sales manager with headquarters in Chicago. G. J. Klein, formerly manager, Akron office, is now rubber products manager for the Midwest, Southwest, and Pacific Coast. Mr. Klein will make his headquarters in Akron.

Smith, Others Advance

H. Gordon Smith, vice president and general manager of the textile division, has been named to the newly created post of executive vice president of United States Rubber Co., Rockefeller Center, New York 20, N. Y. The new position was created because H. E. Humphreys, Jr., has been called upon to do double duty as president and chairman.

William E. Clark, assistant general manager of the textile division, has been elected a vice president and made gneral manager of the division.

Samuel R. Phillips is now assistant general manager of the textile division. He joined the rubber company in 1939 at Stark Mills, Hogansville, Ga., and was transferred to the company's general offices in New York in 1941. In 1946 he was appointed assistant manager of sales and production coordination and became manager of this department in 1948. During World War II, Mr. Phillips served two years in the Navy.

The promotion of five executives in the tire division was also announced last month by H. N. Hawkes, vice president and general manager of the division.

J. Chester Ray is now executive assistant to the general manager, with offices in New York. In this capacity Mr. Ray will assist Mr. Hawkes and J. M. Miller, assistant general manager, in the administration of the company's tire business.

Mr. Ray started with U. S. Rubber as a stockroom boy in Pittsburgh; became manager of the Pittsburgh branch in 1922; next held several key assignments in both U. S. tires and Fisk tires sales; in 1942 was loaned to the government as a special assistant of operations for the OPA tire rationing branch; in 1947 was appointed sales manager for U. S. tires and in September, 1950, sales manager, dealer brands.

Wilson O. Green has been named general sales manager, tire division, with responsibility for all sales of the division except those made to original equipment customers. The latter will continue to be handled at Detroit, Mich., under the direction of W. D. Baldwin.

Green became associated with U. S. Rubber in 1935 as assistant to the district manager at Charlotte, N. C. Since then he has held assignments as a sales representative for U. S. tires at Raleigh and Baltimore. He was also U. S. tires district manager at Baltimore. In 1947 he moved to the company's New York office to become manager of retail merchandising and later manager of U. S. dealer development. Green was appointed Fisk sales manager in February, 1949, and upon the creation of the Fisk-Gillette tires division in mid-1949 he became its sales manager. In September, 1950, he was made sales manager, U. S. tires.

Succeeding him in that capacity is Lawler B. Reeves, manager of the tire division's government department since August, 1950. He joined U. S. Rubber as a sales representative in 1941 and has held assignments as manager of the aircraft tire department, manager of farm market sales, and assistant director of the manufacturers sales division.

Thomas J. Newton, general service manager, tire division, since August, 1950 has been named assistant to the general manager, tire division, since August, 1950 ment as Assistant Rubber Director in 1944 and 1945. With U. S. Rubber he has held assignments in test wheel and field service engineering for 15 years. In his new assignment Newton will relate government controls on rubber to tire division operations and will serve as adviser to the general manager.

Pach Bros.

R. A. Blake succeeds Newton as general service manager, tire division. Blake, with a background of 26 years in the tire industry, has been with U. S. Rubber since 1937. He has held several key assignments in the service and in the sales departments. Since July, 1948, he has been assistant general service manager.

Green, Reeves, and Newton will headquarter in New York, while Blake will maintain his office at the Detroit plant.

Creation of six divisional sales areas and the promotion of six executives to the position of divisional manager were also announced last month by the U. S. tire division.

Wm. J. Palmer becomes manager of the eastern division, with offices in New York, to include the sales districts of New York, Boston, Buffalo, Newark, Baltimore, Philadelphia and Springfield. He formerly was district manager at New York, now the assignment of Louis B. Giardino, sales representative at New York.

Frank C. Johnson heads the new north central division with headquarters in Cincinnati, where he was district manager. The Cincinnati, Detroit, Indianapolis, Grand Rapids, Cleveland, and Pittsburgh districts comprise Johnson's division.

James A. Napier, assistant district manager at Cincinnati, has been made district manager there.

The central division, composed of the sales districts of Chicago, Minneapolis, Fargo, Milwaukee, and St. Louis, is under Ben H. Bowen, formerly district manager at Chicago, where he will continue his headquarters.

The Dallas, Kansas City, Oklahoma City, Omaha, and Des Moines districts make up the new mid-western division, with James E. Kennedy divisional manager. Kennedy will maintain offices in Dallas, where he has been district manager since 1946.

Paul J. Sandridge, assistant district manager at Jacksonville, succeeds Kennedy as district manager.

Harry C. Oliver, district manager of the Los Angeles district, is now divisional manager of the western division, which includes the sales district of Los Angeles, San Francisco, Denver, and Salt Lake City. His offices are in the Los Angeles plant of U. S. Rubber.

Walter F. Brown, assistant district manager at Los Angeles, succeeds Oliver as district manager.

Harry R. Mack has been assigned as divisional manager of the southern division, with headquarters in Atlanta. Mack, field manager-sales, had been stationed in the general offices in New York. His division embraces the districts of Atlanta, Charlotte, Memphis, and New Orleans.

R. W. Collings has been appointed market development manager to plan and coordinate market development activities for the U. S. tires division. Divisional managers will be closely associated with Mr. Collings.

Harry E. Humphreys, Jr., will serve as commerce and industry chairman for New York's 1952 Red Cross Fund Campaign.

The rubber company on September 17 announced the appointment of F. T. Kelly Co., Jacksonville, Fla., as a wholesale distributer of U. S. Carpet Cushion and Carpet Cushion, Jr., in the State of Florida.

Naugatuck Chemical Division is building a new warehouse, office, and compounding plant of approximately 40,000 square feet at 5901 Telegraph Rd., Los Angeles, Calif. Occupancy is scheduled for December 15.

American Cyanamid Co., 30 Rockefeller Plaza, New York 20, N. Y., on September 25 announced that it has consolidated its several office and warehouse locations in Los Angeles, Cal., into the newly constructed building at 2300 S. Eastern Ave. Open house ceremonies marked the formal opening of the building on September 27.

Among Cyanamid executives whose offices are in the new building are: Sheldon Dahl, West Coast manager in charge of sales and manufacturing of the industrial chemicals and plastics and resins divisions; Edward Larson, regional manager of Lederle Laboratories division; and the following West Coast department heads of Calco Chemical division: H. L. Oak, pigment; and W. D. Walker, pharmaceuticals.

Foam Rubber and Carpeting

Collins & Aikman, New York, N. Y., through President Albert R. Jube, has announced a new process for integrating a foam rubber backing with carpeting. The new method applies the foam composition directly to the fabric in the form of a thick cream which solidifies into a pad that is an integral part of the carpet. Unlike previous methods of bonding the foam pad to carpeting by means of an adhesive, the new process avoids any nonadhering spots, makes unnecessary the use of heavy backing threads, and gives a denser weave and lower pile height that adds to the wearing quality of the carpeting, the company claims.

No binding of edges is necessary with the new process, and the carpet can be cut easily into any pattern. Since color can be incorporated into the foam to match the carpet color, no unsightly edges appear. The foam rubber backing can be applied to a thickness of 5/6-inch. The process has been found suitable for fabrics made of nylon, animal fibers, carpet viscose, and blends of these fibers. Sample installations have already been made in the automotive field where the vibration and sound-deadening properties of foam-backed carpeting are of importance.

Changes Name

The corporate name of Southern Alkali Corp. has been changed to Columbia-Southern Chemical Corp. A wholly owned subsidiary of Pittsburgh Plate Glass Co., the firm is a producer of soda ash, chlorine, caustic soda, and related chemicals. Plants are located at Barberton, O.; Corpus Christi, Tex.; Natrium, W. Va.; Lake Charles, La.; and Bartlett, Calif.

Clarence M. Brown, chairman of the board for both Pittsburgh Plate and Columbia-Southern, stated that the action involves a change in name only. He said that personnel, policies, and customer relations will not be affected.

Seiberling on TV

Seiberling Rubber Co., Akron, O., makes its debut in television advertising this fall. As part of a drive to build sales, the company will sponsor "The Amazing Mr. Malone," a half-hour mystery thriller, over the American Broadcasting Co. network, every other Monday night from 8 to 8:30, beginning September 24. At least 44 stations will carry it, many of them by live telecast and others by kinescope. Lee Tracy, star of motion pictures, television, and radio, will play the title role.

C. E. Steiert has been named manager of warehousing and shipping at Seiberling. He joined the company's time study staff in 1948 and was appointed assistant to Wilfred Andrew, factory personnel administrator, the following year.

Storing and shipping of finished goods were formerly handled by the sales department at Seiberling. However, since routing of large tonnages is more a production-type operation than a sales-type planning and handling, the job has been turned over to the factory.

Seiberling's traffic department will continue to report to merchandise distribution, which issues all shipping instructions.

Steiert joined Goodyear Tire & Rubber Co. in 1942. He also graduated from the Goodyear squadron training program and was a time study engineer before coming to Seiberling.

Buys Tape Concern

Hess, Goldsmith & Co., Inc., weaver of glass textiles, 1400 Broadway, New York, N. Y., has contracted to acquire the assets of Horace Linton & Bro., Inc., Philadelphia, Pa., pioneer manufacturer of industrial tape. Hess, Goldsmith is a supplier of broad glass fabric to the electrical, plastics, aircraft, automotive, rubber, coated fabric, and chemical industries.

Included in the newly acquired facilities are narrow fabric weaving plants in Philadelphia, Pa., and Pleasantville, N. J., which will be operated as the Horace Linton Division of the purchasing company.

The following appointments for the new division have been also announced: Wallace R. Linton, former president of the Philadelphia company, vice president and general manager; and Dominic A. Siravo, former Linton vice president, assistant to the general manager. Raymond F. Clark, vice president for industrial sales of Hess, Goldsmith, assumes sales responsibility for the new division. All other Linton personnel will retain their present positions.

In Brazilian Enterprise

Arrangements have been concluded between B. F. Goodrich Chemical Co., Rose Bldg., Cleveland, O., and S. A. Industrias Reunidas F. Matarazzo for the formation of a jointly owned plastics manufacturing company, Geon DO Brazil, with plants near Sao Paulo, Brazil, according to W. S. Richardson, president of the Chemical company.

The new firm will have initial production capacity of 6,000,000 pounds annually of Geon polyvinyl materials, used to make luggage, rainwear, flooring, insulation, and a wide variety of other products for industry and the home.

Plants to be built near Sao Paulo will manufacture vinyl chloride monomer, Geon polyvinyl chloride resins, and Geon plastic compounds. The engineering work is well under way, and completion of facilities is expected by late 1952 or early 1953.

"Creation of the new company is another step in the industrializaton of Brazil," the Chemical company president pointed out, "and is in accord with the policy of the Brazilian Government to encourage new enterprises which utilize the countrys' raw materials."

Though Goodrich Chemical is furnishing the design and manufacturing techniques and the technical "know-how," the new plants will be operated by Brazilian personnel.

S. A. Industrial Reunidas F. Matarazzo operates 300 diversified businesses and is one of the largest industrial firms in South America.

Product Developments

Geon 404 a rigid vinyl plastic recently introduced by Goodrich Chemical, was used for the construction of a special tank to hold a highly corrosive acid used for fluoridation of the water supply for Avon Lake, O. Donated to the city by the company, the vessel was constructed to hold hydrofluosilicic acid, an additive used in drinking water to reduce tooth decay. The plastic, chosen for this tank because of its outstanding chemical resistance and ease of fabrication, is expected to find many other industrial applications where stainless steel or lead equipment is now used.

A plastisol made from Goodrich Chemical's Geon paste resin is used to coat luminescent fabrics for rubber raincoats, toy animals, dolls, children's handbags and belts, gun holsters, lampshades, and baseball caps that glow for hours in the dark. Introduced by R. H. Macy & Co., New York, N. Y., the luminescent items are activated by daylight or electric lights and glow a light purple for 10-12 hours. The plastic coating is used to give the fabric toughness, abrasion and chemical resistance, flexibility, and a moistureproof covering for the luminescent pigment in the fabric. The raincoats have strips of glowing plastic across the back, arms, and front for added safety of school children on the street during the twilight and early evening hours. In addition to the lampshades and other products, Macy's is introducing rolls of luminescent fabric, both with and without adhesive backing, for marking children's outer clothing, light switches, and other applications. In manufacture of the fabric a succession of plastisol layers is applied to the material in six passes through a spread coating unit. The top layer is a clear, two-mil thick film under which are the pigmented luminescent layer and the base coats.

Snyder Blaw-Knox Head

W. Cordes Snyder, Jr., has been elected president and chief executive officer of Blaw-Knox Co., Pittsburgh, Pa. He one time had been a vice president of the company in charge of its Lewis Foundry & Machine Division and more recently was vice president of Koppers Co. and manager of its metallugical department.

William P. Witherow, formerly president and chairman of Blaw-Knox continues as chairman of the board; while Chester H. Lehman retains his present capacities of vice chairman of the board and executive vice president.

General Tire Appointments

Wayne J. Wheeler has been appointed works manager of the Bowling Green, O., division of The General Tire & Rubber Co., Akron, O. Formerly with Jack & Heintz Precision Industries, Mr. Wheeler will be in charge of all manufacturing functions pertaining to production, planning and scheduling, facility engineering, industrial relations, and cost control and quality control.

Purchasing, accounting, and government contract negotiations will remain under direct control of General's Akron offices. Industrial relations will be under the functional control of John Mead, director of industrial relations.

The Bowling Green operation was formerly the Grieder Machine Tool & Die Co., recently purchased by General, and now represents a major expansion in General's metal products division.

R. W. Henderson, operating manager of General's San Francisco branch, has been promoted to assistant branch manager, J. E. Powers, General's trade sales manager, announced last month.

R. M. Cregan succeeds Henderson as office manager, and J. R. Galbreath, Los Angeles branch office and credit manager, assumes duties as the supervisor of credits and collections for the San Francisco branch. Galbreath's new title is district credit manager.

The establishment of a market research department at General Tire was announced last month by M. G. O'Neil, executive assistant to the president. Creation of the department is a result of General's recent expansion into new products and new fields, O'Neil explained.

Henry H. McKee, Jr., former market research director at the Perfect Circle Corp., has been named to head the new unit. Previously he had been with Firestone Tire & Rubber Co. as a market analyst.

Vote Stock Split

Stockholders of Diamond Alkali Co., 300 Union Commerce Bldg., Cleveland 14, O., on August 30 at a special meeting authorized a split of the company's common capital stock on the basis of two shares for one and also authorized the board of directors to exercise an option to acquire Kolker Chemical Works, Inc., with 33,500 shares of Diamond stock.

Company officials said that after the necessary details for making the split are worked out, stockholders will be advised in writing soon on exchanging their present shares for the new shares.

3 Good Questions...

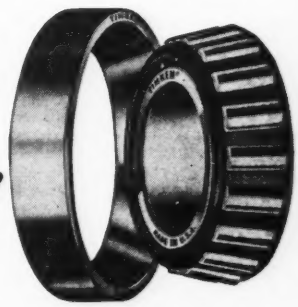
Why do TIMKEN® bearings take heavier loads and have longer life?

Why do TIMKEN bearings resist wear and retain precision longer?

Why are TIMKEN bearings more uniform in their high quality?

One Good Answer—

THE TIMKEN COMPANY MAKES ITS OWN STEEL!



THERE are several good answers to the questions above. But one of the *basic* reasons for the superior load capacity, wear resistance, and uniform high quality of Timken® bearings is the fact that the Timken Company makes its own steel. And the Timken Company is the only bearing manufacturer in America that does!

Having its own steel-making facilities enables the Timken Company to carry on research and development in steels that results in constant improvement in quality. It also permits complete control of the product—from melting through final inspection.

The high quality of Timken steel begins in the melting of selected scrap. Correct chemical composition of every heat is insured by use of the direct-reading spectrometer, new scientific instrument for analyzing a heat of steel in a matter of seconds. Even after the steel is in billet form, quality safeguards continue. The billets are scarfed and chipped to prevent cracks and flaws in the internal structure of the finished product.

Along with advanced design, precision manufacture, and rigid quality control, Timken steel is one of the big reasons why it pays to always look for the trade-mark "Timken" on the tapered roller bearings you buy. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ont. Cable address: "TIMROSCO".

TIMKEN TRADE-MARK REG. U. S. PAT. OFF. *TAPERED ROLLER BEARINGS*

NOT JUST A BALL ◯ NOT JUST A ROLLER ⬭ THE TIMKEN TAPERED ROLLER ⬭ BEARING TAKES RADIAL ◫ AND THRUST →◫← LOADS OR ANY COMBINATION ✳

Goodrich Appointments

The B. F. Goodrich Co., Akron, O., last month made the following changes in personnel.

Harold Williams has been named special representative in Washington, D. C., for the Goodrich industrial and general products sales department. With the company 18 years, Williams started as a production scheduler and joined the industrial products sales division in 1943. Since 1946 he has been a sales representative of B. F. Goodrich Chemical Co. in New York and Washington. Williams succeeds the late Ralph H. Whitney.

Ralph T. Rabe has been named manager of the new district office at 200 Forsythe St., Atlanta, Ga., for the automotive, aviation, and government sales division. Rabe started with the company in 1923. After holding several important supervisory positions in the factory, he joined his present division in 1941 and in 1946 became manager of the Miami, Fla., district office.

Ancel B. Hersman succeeds to that post for both the automotive, aviation, and government division and International B. F. Goodrich Co. He came to Goodrich in February, 1941. In September, 1945, he moved to International Goodrich as a senior sales correspondent, assuming new duties as manager of sales promotion for aeronautical products in that division in June, 1950.

Robert W. Powell is now manager of purchasing for The B. F. Goodrich Co. of California, with L. K. Jones as his assistant.

Foster D. Snell, Inc., firm of consulting chemists and engineers, 29 W. 15th St., New York 11, N. Y., recently added the following technical personnel to its staff: Donald A. Peck, Peter Franco, Arthur Graff, David M. Wetstone, Gonzalo Segura, and Joseph Pescatore.

Cornelia T. Snell, research group leader of the firm, spoke at the recent thirteenth summer conference of the New England Association of Chemistry Teachers at the University of Rhode Island. Her topic was, "Consulting Chemistry as an Example of Industrial Research." On August 27, Dr. Snell was one of three women chemists who participated in a broadcast interview by CBS on the subject of the role of women in chemistry.

Highways Held Inadequate

The inadequacy of our national highways is the theme of an institutional advertising campaign being launched by Goodyear in metropolitan newspapers, national magazines, and trade papers. The initial advertisement sets the theme for the series with a statement by Paul W. Litchfield, Goodyear Board chairman, calling attention to the vital part played by our highways in both defense and general progress. Our highways have not kept pace with the rapidly growing number of vehicles on the roads, the advertisement declares. This nation has not built enough highways, or good enough highways, to meet its requirements. The resulting squeeze is dramatized by illustrating that 80% of all interstate traffic, 90% of all foodstuffs going to market, and 75% of all general freight rolls the highways to reach their destinations.

Firestone Tire & Rubber Co., Akron, O., has signed contracts amounting to $5,155,500 with the Navy and the Army Engineer Corps for the engineering and construction of a new type of abandonship inflatable boat and an improved 12-ton half-float. According to J. E. Trainer, vice president in charge of production, the boats and floats will be produced in the company's Memphis, Tenn., plant. The half-floats are used in place of pontoons to support bridge superstructures for crossing military vehicles over streams and rivers.

WEST

C. P. Hall Co., 5145 W. 67th St., Chicago 38, Ill., sales agent for an all-rubber drum manufactured by The General Tire & Rubber Co., has announced that a research program is under way to test an extensive list of corrosive chemicals for use in the drum. The drums are made with natural rubber, neoprene, butyl, and other synthetic rubbers to withstand many corrosive materials, including muriatic acid, hydrofluoric acid, ferric chloride, and aluminum chloride. The drums weigh 34 pounds, are 20½ inches high, take up about 1¼ square feet of floor space, and have a capacity of 13 gallons. Use of the all-rubber drum is claimed to eliminate all breakage and maintenance. The owner's name and the drum number are permanently vulcanized on the drum. Companies interested in having some of their corrosive chemicals included in the testing program are invited to write Hall for further information.

Rubbercraft Corp. of California, 110 E. 17th St., Los Angeles 15, Calif., is building a new office and extension of its shipping, receiving, and warehouse facilities at its factory in Torrance, Calif.

Plastic & Rubber Products Co., 2100 Hyde Pk. Blvd., Los Angeles 47, Calif., has taken a long-term lease on an adjacent building and is remodeling it to house the company's mill room, machine shop, and laboratory.

Hoff Rubber Stamp Co., Inc., 224 S. Fourth St., Minneapolis, Minn., manufacturer of rubber stamps and etched metal plates, has purchased a new factory building in suburban Minneapolis, which will provide 10,000 square feet of floor space and house the latest type of equipment. Production at the new location is expected to get under way this month. Increased demands on production, stemming in part from defense contracts, and a decision to make service available locally to suburban business firms, were reasons given for the move.

The company will continue, however, to operate a sales office at 224 S. Fourth St., where it has operated since 1917 when it was founded to produce rubber stamps. In 1929, facilities were added for the production of etched metal plates. Today the company makes a complete line of rubber stamps, stencils, and steel stamps as well as all types of etched plates and plaques.

Promotions at Phillips

Five personnel changes in Phillips Chemical Co., Bartlesville, Okla., were made last month.

J. W. Barber, superintendent of the Philblack plants at Borger, Tex., has been transferred to the Philblack sales division as rubber service engineer. He recently returned from an extended assignment in England, in connection with the start up of operations of the Philblack, Ltd., plant.

Succeeding Barber as superintendent of Philblack plants is A. J. Head, acting superintendent during Barber's absence.

Austin Morgan, services superintendent at Plains Plant, Borger, has been assigned to the newly created position of assistant chief mechanical engineer, in Bartlesville. H. H. Stoelzle, acting mechanical and maintenance superintendent at Plains Plant, is Mr. Morgan's successor there.

M. L. Studebaker, consulting chemical engineer in the process engineering division, has been sent to the Philblack sales division as technical service engineer, with headquarters in Akron, O.

American Latex Products Corp., 3341 W. El Segundo Blvd., Hawthorne, Calif., has a new foam rubber plant in operation producing mattresses and allied products. Don Walker, formerly of Dunlop Tire & Rubber Goods Co., Ltd., and General Latex & Chemical Corp., is general manager of the foam plant. Randy Kielich, formerly with Dunlop Tire & Rubber Corp., is chief compound chemist, and Russ Nagle is plant superintendent.

Union Rubber Co., 808 E. 62nd St., Los Angeles 1, Calif., is building a new office and plant in Oakland, Calif.

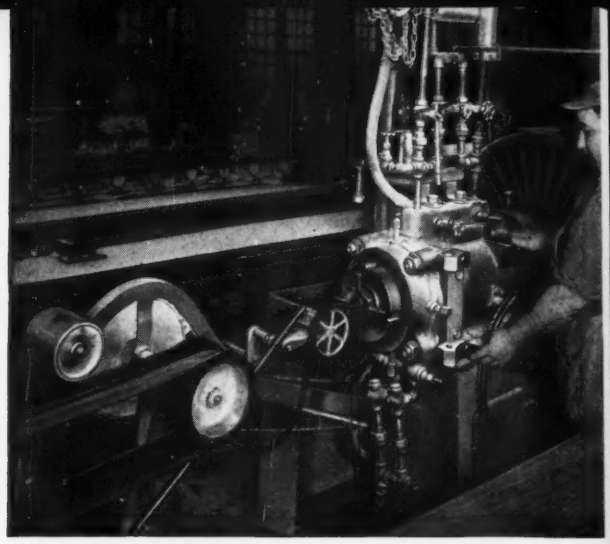
David M. Bliss is now the chemist at the Rubber Corp. of California, 10631 Stanford Ave., Garden Grove Calif. He was formerly with the footwear division, United States Rubber Co., Naugatuck, Conn.

Opens New Plant

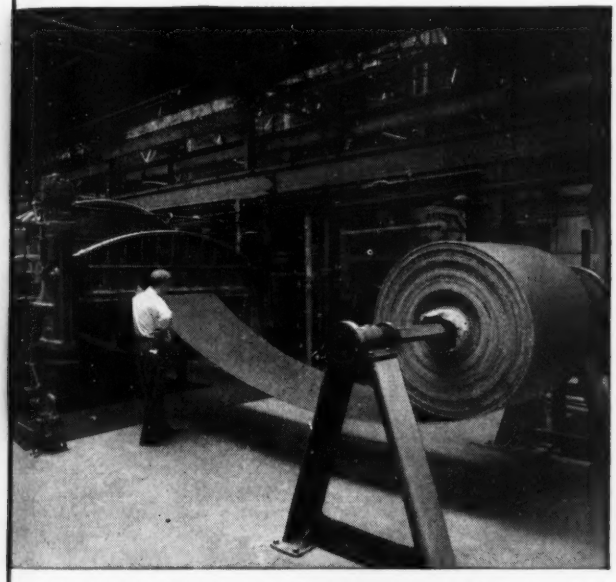
Officials of Dewey & Almy Chemical Co., Cambridge, Mass., were guests of honor at a dinner given by the Chamber of Commerce of Cedar Rapids, Iowa, on September 13. The dinner celebrated a new plant opened by the company in Cedar Rapids to manufacture Cry-O-Rap plastic bags. The main course at the dinner was roast turkey cooked in tthe plastic bag in which the stuffed and dressed birds had been packed and frozen by the grower. Company President Bradley Dewey stated that the idea of offering consumers dressed and stuffed poultry ready to cook in the bag was still in the test stage, and that such items would not be available to consumers on a national scale until at least next year. The method eliminates the need of cleaning, dressing, and stuffing poultry and reduces total preparation and cooking time. The Cedar Rapids plant will double the company's Cry-O-Rap bag capacity and will serve Midwest packers who use the bags for packaging fresh and frozen poultry and meats. The bags are part of the Cryovac process in which the item to be packaged is placed into the bag, vacuum sealed, and flash dipped into hot water, which shrinks the bag around the product.

(*Continued on page* 112)

A TOY COMPANY saves $18,000 a year by using a Sun Rubber-Process Aid. Rejects due to blooming have been eliminated. Plasticization has improved so much that toys can now be molded in more intricate designs and with more eye-appeal.



A MANUFACTURER OF MECHANICAL RUBBER GOODS eliminated costly rejects due to scorching, by switching to a Sun Rubber-Process Aid. By properly conditioning his stock—making it easier to work—the Sun aid speeded up extruding.



A MANUFACTURER OF INDUSTRIAL BELTS improved the quality of his products and cut his inventory costs $6,000 a year by replacing five competitive aids with two Sun Rubber-Process Aids. Now able to buy tankcar lots, he saves still more.

A RUBBER SPONGE MAKER changed from ordinary processing oils to a Sun Rubber-Process Aid because it did not migrate, bloom, or affect his reclaim resin-type adhesives. This extra margin of safety has greatly accelerated production.

HOW 4 MANUFACTURERS HAVE BENEFITED FROM SUN'S RUBBER-PROCESS AIDS

By switching to Sun Rubber-Process Aids, each of these four manufacturers increased the efficiency of his plant, improved the quality of his products, and effected substantial savings. The results, condensed into a few words here, are typical, not unusual. Full information on request. More and more manufacturers are turning to Sun "Job Proved" Process Aids to cut costs, speed production, improve quality. The services of a Sun technical representative are yours for the asking. Just call the nearest Sun Office or write to Department RW-10.

SUN INDUSTRIAL PRODUCTS

SUN OIL COMPANY, PHILADELPHIA 3, PA. • SUN OIL COMPANY, LTD., TORONTO AND MONTREAL

SUNOCO®

Originators of the Liner — *Capitol Process Treatment*

We Do the Following Types of Finishing

1. Treating of all types of cotton duck and cotton piece goods with our CAPITOL LINER PROCESS. We are in a position to supply a complete liner, if desired.
2. Resorcinol Formaldehyde Latex processing on cotton piece goods, rayon, nylon and celanese.
3. Mildew Resistant Treatment of all widths and weights of belting, hose, number and army ducks.
4. Fire, Water, Weather and Mildew Resistant Finishing of number duck and U. S. Army duck to Government Specifications.

Details Upon Request

TEXTILE PROOFERS INC.

193 Culver Ave., Jersey City 5, N. J.

New Goods and Specialties

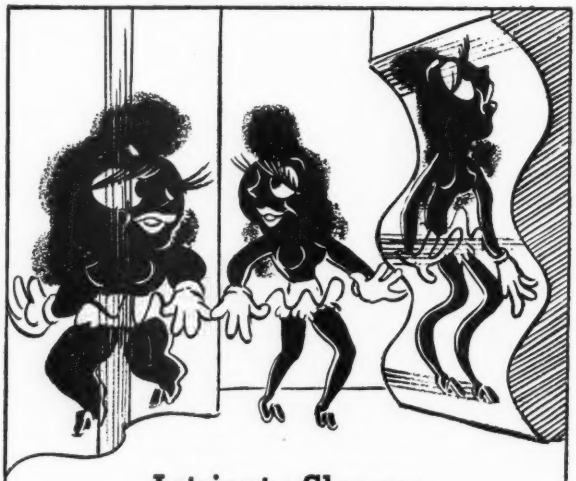
Plastic Coated Glove That Can Be Worn on Either Hand

Reversible Plastic Coated Gloves

REVERSIBLE plastic coated gloves, so constructed that they can be worn on either hand, have been introduced by Washington Glove Corp., Milwaukee, Wis. Available for practically every type of industrial use, the gloves are jumbo cut and have a soft, fleecy lining for maximum comfort. The reversible feature eliminates the wearing-out characteristics of ordinary gloves and allows more finger freedom. The plastics used for coating the gloves are said to give a product that is pliable and strong; does not crack, scuff, or peel; is resistant to acids, chemicals, flame, and abrasion; has a non-slip finish; and is easily laundered. For users with a specific problem the company has a testing laboratory to work out a satisfactory solution. Standard gloves are available in knit wrist, short gauntlet, and full gauntlet models. Plastic coatings are available in red, green, black, brown, and natural colors.

Plastic Tank Liners

COMPLETELY welded polyethylene plastic tank liners of both removable and permanet types are being offered by American Agile Corp., Cleveland, O. Made to customers' specifications, these liners are fabricated in all sizes and shapes with wall thicknesses up to one inch. The liners can be furnished with polyethylene drains, overflows, pipe flanges, fittings, and valves, thus permitting direct connection to existing pipe lines and installations. The chemical inertness of the plastic and the welding method employed in the fabrication of the tanks guarantee a leakproof liner. Depending on the size and complexity of design, the liners are fabricated either at the company's plant or at the site of final installation.



Intricate Shapes

SEE PAGE 4

An 800 TON HYDRAULIC PRESS....

FOR THE PRECISION MOLDING OF RUBBER PRODUCTS

THIS Erie Foundry Company 800 Ton Precision Hydraulic Press is designed and built to close tolerances. A number of these special presses purchased by one of the nation's largest rubber processors, are required in precision molding of special rubber products. Your specifications for precision presses are in capable hands when you send them to Erie Foundry Company. A half century of engineering and craftsmanship is at your command. Write for bulletin 350.

ERIE FOUNDRY COMPANY HYDRAULIC PRESSES

ERIE FOUNDRY COMPANY • ERIE, PA., U.S.A.,

DETROIT
335 Curtis Building

CHICAGO
549 Washington Boulevard

INDIANAPOLIS
2302 N. Meridian Street

NEW ENGLAND
G. V. Eads
R. D. 2 Southberry, Conn.

PHILADELPHIA
Girard Associates
42 North 52nd Street

You'll get **LATEST** information about **247** different kinds of products at the...

23rd Exposition of CHEMICAL INDUSTRIES
Grand Central Palace
New York
November 26 • December 1

Abrasives
Acids
Acidifiers
Acid Plants
Acid Resisting Materials
Adhesives
Agitators
Air Conditioning Apparatus
Alcohol
Alkalies
Alloys, Ferrous
Alloys, Non-Ferrous
Anodes
Asbestos
Autoclaves
Automatic Temperature Control

Bags
Balances and Weights
Barrels, Drums & Kegs
Baskets, Dipping
Bearings
Belts
Blast Equipment—Sand Blowers
Boilers
Boiler Covering and Insulation
Bolting Cloth
Bottling Machinery
Brick, Acid Proof
Brick, Insulating
Brick, Refractory
Briquetting and Tablet Making Machinery
Buckets, Elevator
Building Materials
Burners

Cabinets—Chemical, Filing and Laboratory
Calciners
Calorimeters
Cans
Carbon
Carboy Tilters
Cars, Tank
Castings
Caustic Pots
Cellulose
Cement
Centrifugals
Ceramics
Chemical Plant Equipment
Chemical Stoneware, Acid Proof
Chemicals, Industrial
Chemicals, Laboratory
Chemicals, Pharmaceutical
Chemists
Chlorinators
Clarifiers
Classifiers
Clutches
Coal Tar Oils
Coatings—Protective
Coils
Coke Oven Machinery
Collectors
Colloid Mills
Colorimeters
Colors, Dry
Comparators
Compressors
Concentrators
Condensers
Contractors
Containers
Control Apparatus
Controllers
Conveying Machinery and Equipment
Coolers
Cooperage
Couplings
Crucibles
Crushers, Grinding Mills and Pulverizers
Crystallizing Equipment
Cylinders for High Pressure Gases
CO_2 Recorders

Decolorization and Purifying Materials
Detergents
Digesters
Dissolvers
Distilling Machinery and Apparatus
Drives
Dryers, Centrifugal
Drying Machinery and Equipment
Drums, Rotary, Vacuum
Dust & Fume Collecting Systems
Dust and Spray Masks

Ejectors
Electronic Equipment
Elevators
Emulsifiers
Emulsions
Enameled Apparatus
Enamels
Engineers
Evaporators
Exhausters
Explosives
Extraction Plants
Extractors

Feeders
Fillers
Filling Machines
Filter Aids
Filter Cloth
Filter Cloth, Metallic
Filter Paper
Filters
Fire Detection
Fire Extinguishers
Fire Proofing Compounds
Fittings
Flooring
Food Industries Equipment
Furnaces and Accessories

Gages
Gas Boosters
Gas Producers
Gas Purifiers
Gases
Gears
Glass—Optical Glassware
Grating
Grinders
Heat Exchangers
Heaters and Heating Equipment
Heating Systems and Accessories
Hoists
Homogenizers
Hoods, Fume
Humidifying Apparatus

Indicators
Instruments, Optical
Instruments, Testing
Instruments of Precision
Insulating Material—Heating, Electric and Molded
Insulation, Furnace

Kettles
Kilns

Labeling Machines
Laboratories, Testing
Laboratory Apparatus and Supplies
Laboratory Furniture
Lacquers
Lamps
Lead Burning and Coating
Lime, Chemical and Hydrated
Loaders

Magnetic Separators
Masticators
Material Handling Equipment
Metal Coating and Plating
Metal Containers
Metals
Meters
Microscopes
Mills
Minerals
Mixing and Kneading Machinery
Molding Machinery
Motors, Electric
Naval Stores
Nitrators
Nozzles, Spray

Ovens, Electric, Laboratory
Ovens, Industrial

Packing
Packaging Equipment and Supplies
Paper Machinery
Perforated Metals
Petroleum Products
pH Equipment
Pharmaceutical Machinery
Pigments
Pipe and Fittings
Plastics
Plasticizers
Platinum—Wire, Sheet, Foil, Crucibles, Laboratory Ware
Porcelain Ware
Presses, Hydraulic
Pressure Relief and Rupture Relief Devices
Publishers
Pulverizers
Pumps
Pyrometers

Raw Material
Rayon Equipment
Recording Instruments
Refractories
Refrigerating Equipment
Regulators, Pressure and Temperature
Respirators
Resins and Oils
Rotameters
Rubber Products and Equipment
Rust Proofing

Safety Equipment
Salt
Scales
Screens—Inclined, Vibrating and Gyratory
Screens—other
Sealing Machines
Separators
Sheet Metal Work
Sieves, Laboratory
Sifters
Silica
Sinks, Laboratory, Acid Proof
Sizers
Solvent Recovery Equipment
Solvents
Spray Drying Systems
Speed Reducers
Stair Steps, Safety
Steel Grating and Flooring
Sterilizers
Stills
Strainers
Strapping, Steel
Switches

Tachometers
Tanks
Thermometers
Thickening and Dewatering Machinery
Tower Packing or Filling
Towers
Transmission Equipment
Tubes

Ultra Violet Lamps

Valves and Fittings
Ventilating Apparatus
Vibrators

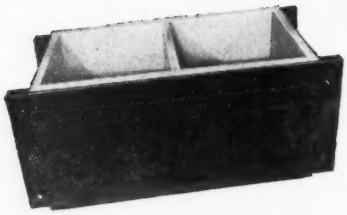
Waterproofing Compounds
Water-Equipment
Waxes
Welding Equipment
Wire Cloth
Wood Flour

X-Ray Equipment

If you are concerned with the chemical aspects of rubber manufacturing, this great Exposition is a timely opportunity—to see and learn about the latest equipment, materials and methods available for your specific industry—to discuss present problems and future operations with technical men in over 400 informative exhibits — to become more valuable to your company by being fully informed, up-to-date.

PLAN NOW TO ATTEND

Management International Exposition Co.



Two-Compartment, Removable Polyethylene Liner Fitted into a Wooden Tank

Tricky Trixie Doll Has Rubber Body and Wire Skeleton That Permit Twisting into Any Position

Flexible Rubber Doll

A NEW flexible rubber doll having a latex skin made by Dewey & Almy Chemical Co., and stuffed with foam rubber, is being manufactured by Sayco Doll Corp., Brooklyn, N. Y. Named Tricky Trixie, the doll has a combination of a rubber body with a wire skeleton that permits it to be bent in any position, hold any pose, and even hold small objects in its hands. The latex skin features softness, washability, and lifelike feel and appearance. The doll stands 13 inches high, coos when squeezed, and comes in a variety of outfits, as shown in the accompanying photograph.

THE ITALIAN GOVERNMENT IS REPORTEDLY CONSULTING WITH petroleum firms on the feasibility of producing synthetic rubber on a commercial scale in Italy. The problem is not so much technical as economic, since Italy did produce about 13,000 tons of synthetic rubber during the war. At that time, however, cost was no object.

Cabot's New Oil Furnace Black!

Sterling-V
(V for VERSATILE)

IDEAL FOR MECHANICAL GOODS!

Investigate these Qualities of

SYNTHOL

for your Synthetic Production

Also Mfrs.of

RUBBEROL AND ***GLYCERIZED LUBRICANT***

INTERNAL LUBRICANT — FOR SLAB COATING & MOLD RELEASE

QUALITY SINCE 1884

GENSEKE BROTHERS

RUBBER MATERIALS DIVISION

West 48th Place and Whipple Street — Chicago 32, U.S.A.

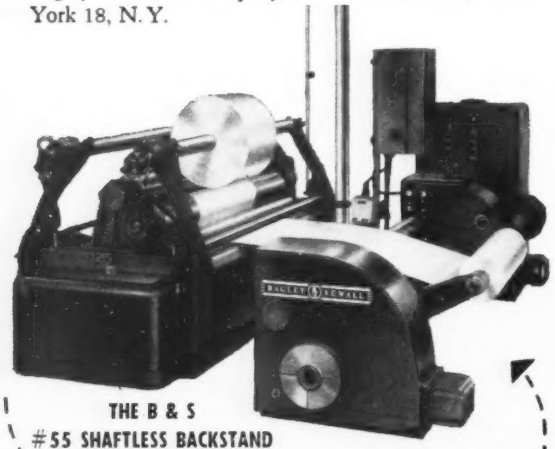
Cut Your Downtime
on mill roll changing
to 1 Minute or Less
with the NEW B&S
SHAFTLESS BACKSTAND

Money-consuming downtime on mill roll changing is cut to the bone by the wholly automatic B & S Shaftless Backstand. Here is what Mr. C. Carr Sherman, President of H. P. Smith Paper Co., has to say about this equipment:

"The engineering of this new unit indicates a fine understanding of the problems of the users of this type of equipment. The Backstand is much easier to handle as there are no shafts. It is also much easier and faster to make changes on it. I believe that changing rolls with this Backstand can be brought down to well under one half minute."

You may purchase the B & S Shaftless Backstand with or without the new B & S Slitter and Rewinder. The Backstand may be used on any type of rewinding equipment, as well as on waxing and laminating machinery, printing presses, etc.

For full details on the Shaftless Backstand and the new B & S Slitters and Rewinders, write to The Bagley & Sewall Company, 500 Fifth Avenue, New York 18, N.Y.



THE B & S
#55 SHAFTLESS BACKSTAND
features automatic tension and side register control; motor for raising and lowering mill roll arms, also motor for moving the arms to accommodate different width rolls. Entire working mechanism is totally enclosed.

BAGLEY & SEWALL
WATERTOWN, NEW YORK
designers and builders of
QUALITY MACHINERY
SINCE 1853
500 FIFTH AVE., NEW YORK 18, N. Y.
Foreign Representative: CASTLE & OVERTON, INC., 630 Fifth Avenue, New York 20, N.Y

EUROPE

FRANCE

Rubber in Airplane Wings

A feature of the XIX International Aeronautical Show held in Paris last June was an airplane with flexible, jointed wings. The plane was designed by the engineer, Rey of Etablissements Matra, who proposed to eliminate or at least greatly reduce the shocks and discomforts attendant on flying at modern high speeds under disturbed atmospheric conditions, by introducing an elastic articulation in each wing at a section more than halfway from the wing tip (at the overhang) and arranged in an oblique direction. These elements, designed and constructed by M. Arsandaux, consulting engineer of Societe Kleber-Colombes, are each made up of ten rubber collars coupled together, which work in pure torsion; the whole is covered by a rubber sheath so as to present an unbroken surface. According to reports, the new elastic joints have been successfully subjected to various tests.

Discussing the new flexible wing, M. Arsandaux[1] suggests that these tests may point the way to a considerable expansion of the field of application of such elastic systems, also in car construction. Suspensions of a similar nature have already been experimented with in the United States, he adds, but here the aim was to replace only the springs and not the shock absorber. Further studies of the possible forms of elastic rubber suspensions for vehicles might lead to the development of elastic elements which require no lubrication whatever and would take the place of both classic springs and shock absorbers. Of course, a first requisite would be to secure a very high degree of adhesion between the rubber mass and the armatures designed to transmit to it in a uniform manner the action of external strains.

In the case of the Rey airplane the strictest precautions have been taken to insure the quality of adhesion and at the same time to reduce the strains of adhesion. M. Arsandaux seems confident that with the progress already achieved in this direction it will be possible to produce the new type of suspension on a commercial scale in the near future.

[1] *Rev. gén. caoutchouc*, 28, 8, 538 (1951).

Klegecell

Klegecell is an exceptionally light cellular product based on polyvinyl chloride, recently developed by Kleber-Colombes. The material, available in both flexible and hard forms, consists of numerous closed polyhedric cells containing a gas under pressure. With a density ranging from 0.035 to 0.150, reported excellent mechanical properties, resistance to fire, cold, water, and all chemical products, and with high thermal, acoustic and electrical insulating properties, Klegecell seems to have a wide field of application, but is said to be particularly suited for use in aeronautics.

The material is said to adhere well to aluminum, plywood, bakelite treated paper, melamine impregnated glass, etc., permitting the manufacture of sandwich products for various purposes. One application already developed is in the manufacture of lightweight, collapsible containers for use on airplanes.

Rubber Consumption and Production

The French rubber industry used 109,071 metric tons of crude rubber in 1950, as compared with 100,890 metric tons in 1949, of which 66,344 tons (against 65,613 tons in 1949) went into the manufacture of tires and tubes of all kinds and for retreading material; while 42,727, against 35,277 metric tons, went into all other rubber goods. Slightly more rubber was used for automobile tires (50,905, against 49,051 tons) and in retreading and repairing, but all other branches of the tire industry showed decreased consumption in 1950 as compared with 1949, probably owing to the strikes in the industry in the Spring of 1950. About 57% of the rubber used for tubes was synthetic, mostly butyl rubber.

Practically all other lines of rubber goods showed increased

WITCO-CONTINENTAL CARBON BLACKS

for rubber compounds

- CONTINENTAL AA or WITCO No. 12 (EPC)
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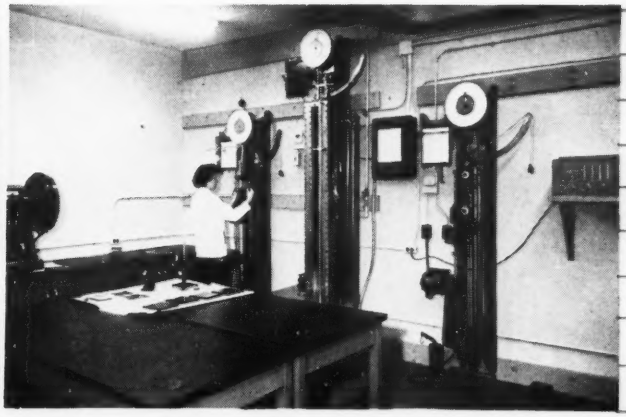
- CONTINEX HMF
- CONTINEX HAF

backed by **WITCO-CONTINENTAL** *Research and Technical Service*

Sectional view of mill room showing compounding of rubber test batches.



Scott Testers for evaluation of rubber compounds. Center machine for elevated temperature tests.

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consumption in 1950; the most notable exceptions were hose and tubing (3,000, against 3,272 tons) and insulated cables (3,358, against 4,043 tons). Increases were heaviest in footwear (7,578, against 5,134 tons); heels and soles (5,113, against 3,819 tons); sponge and foam rubber (3,034, against 1,598 tons).

Available production figures show average monthly outputs during 1950 included roughly 9,000 tons of automobile tires, 1,400 tons of rubberized fabrics, 600 tons of belting, 900 tons of hose and tubing, 2,000 tons of footwear, 1,500 tons of soles and heels, 180 tons surgical and sanitary goods, and 150 tons of sporting goods and toys.

Michelin plans a subsidiary in Morocco, Societé Chérifienne du Pneumatique Michelin, S.A., with an initial capital of 30 million Moroccan francs.

To Develop Synthetic Rubber Industry

On the initiative of the French Alcohol Institute and the General Confederation of Sugar Beet Growers, Société d'Etudes du Caoutchouc Synthetique a Base d'Alcool has been formed with the object of arranging suitable financial, technical, and other conditions permitting the establishment and exploitation of factories for producing synthetic rubber and utilizing the by-products. According to present plans, the organization would use 26-27 million gallons of alcohol annually to produce 35,000 to 40,000 tons of rubber.

It may be recalled that early this year the Union of the Chemical Industries and the Union of Trade Committees of the Petroleum Industry had reported to the Department of Industry and Commerce that synthetic rubber could be produced in France at a price above that of American synthetic rubber, but far below that of natural rubber, delivered in France. The basic raw materials available were stated to be alcohol from sugar beets and oil-refining by-products, and annual production of 40,000 tons of GR-S for tires and 12,000 tons of butyl rubber for inner tubes was envisaged. At the time it was calculated that the former would cost 210 francs per kilogram, and the latter 161 francs per kilogram against 550 francs per kilogram of natural rubber, which was the price in France on January 1, 1951.

Evaluating Curing Properties of Rubber

In the technical grading of crude rubber introduced on estates in the Far East about two years ago, curing capacity has been defined as the modulus at 600% elongation of a standard rubber compound cured for 40 minutes at 127° C. This simple and rapid test has permitted planters to control effectively an increasing proportion of the total output of natural rubber, and many manufacturers appear satisfied that the test does permit adequate differentiation of various types of rubber

At the Institut Français du Caoutchouc, however, it was found

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Production and quality control used to be at loggerheads all the time and Moe Muscles hated the lights and the liver of Inspector Mike. But that's over and done with now. Ever since Dow Corning introduced silicone mold lubricants to the rubber industry over five years ago, there has been a strange and unaccustomed peace between the pressman and the inspector.

That's because Dow Corning Silicone release agents give quick and easy release of even the most complicated parts from molds that stay clean much longer. High surface finish, uniformly sharp detail and closer tolerances come *by the drum* and non-knits, foldovers, loose tuck-unders and not-filled-out parts practically disappear.

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that a test based on the modulus for a single curing period is not sufficient to inform the consumer as to rate of cure and the maximum modulus at the same time. It was therefore proposed to complete the test by a second cure for a different period and to relate the complete vulcanization curves to exponential functions of time. Then it would be possible to deduce: (a) a modulus limit characterizing the stiffness of the vulcanizate; (b) a curing time constant indicating the time required to produce a given degree of vulcanization, the value of this constant increasing inversely as the rate of cure.

The test appears to have been successfully tried on standard compounds from nine different crude rubbers. It is admitted, however, that much must still be done before it can be decided whether the method is applicable to most crude rubbers and whether it can be adapted to the specification of rubber in its present form.

It is further suggested that modulus at 100% elongation instead of 600%, as already recommended by G. Gee and his coworkers, might offer advantages here too.

Dr. Le Bras Honored

The Société d'Encouragement pour l'Industrie Nationale has awarded J. Le Bras its gold medal for his contributions to the chemical arts. Dr. Le Bras, with Institut Francais du Caoutchouc since its inception in 1936, now superintends its research work and that of Institut des Recherches sur le Caoutchouc in Indo-China. His work on modified rubbers and on the direct reinforcement of latex with specially prepared resins has been widely recognized. In another direction, his organization of special technical courses at the I.F.C. for training young rubber engineers has been much appreciated by manufacturers in France and by planting companies in Indo-China.

New Dunlop Projects

Dunlop Rubber Co., Ltd., together with S. A. des Pneumatiques Dunlop recently formed Soc. des Revêtements Cemetex, S.A., with capital of 100,000,000 francs, to manufacture flooring and wall paneling at St. Maur after patents of the Dunlop affiliate, Semtex, Ltd.

French Dunlop also recently opened a new factory at Mantes for the manufacture of latex products, chiefly Dunlopillo and dipped boots. Output of Dunlopillo, started last spring, is expected to reach 100 tons a month by the end of 1951.

GREAT BRITAIN

IRI Notes

At a meeting of the Council of the Institution of the Rubber Industry, July 24, the following were elected Fellows of the IRI: Samuel Buchan, general manager of Andre Rubber Co., Ltd.; A. W. F. Chatfield, development and technical manager, North British Rubber Co., Ltd.

On the same occasion the council agreed that G. E. Holmes-Siedle should assume the duties of secretary immediately, with the title, Secretary and Registrar of the Institution.

The IRI symposium on "Modern Methods of Studying Rubber Properties," was scheduled for September 28 in London, including the following papers:

"Recent Developments in Electro-Static Test Equipment for Evaluating Rubber and Associated Materials," by R. S. Havenhill, St. Joseph Lead Co., New York, N. Y., U.S.A.

"Methods of Determining Chemical Stability of Latex," G. M. Kraay, Rubber Stitchting, Delft, Holland.

"Improved Ovens for Accelerated Aging Tests," S. Eccher and S. Oberto, Pirelli, S.A., Milan, Italy.

"Application of Dielectric Absorption to the Study of the Structure of Vulcanized Rubber" by Dr. Thirion, Institut Français du Caoutchouc, Paris, France.

"Fatigue Testing of High-Duty Rubber Springs," A. E. Moulton, George Spencer Moulton & Co., Ltd.

"Road Service Tests on the Abrasion of Tires," R. D. Stiehler, National Bureau of Standards, Washington, D. C., U.S.A.

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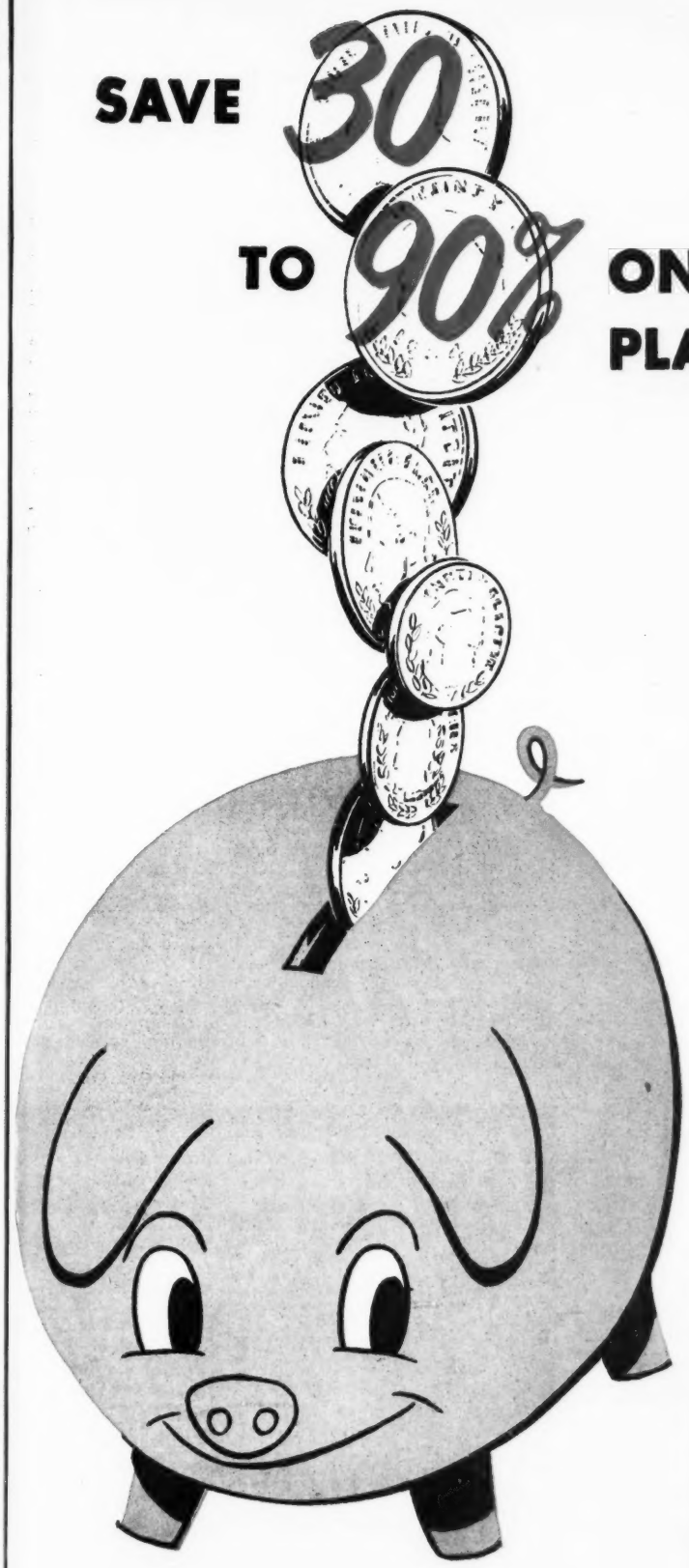

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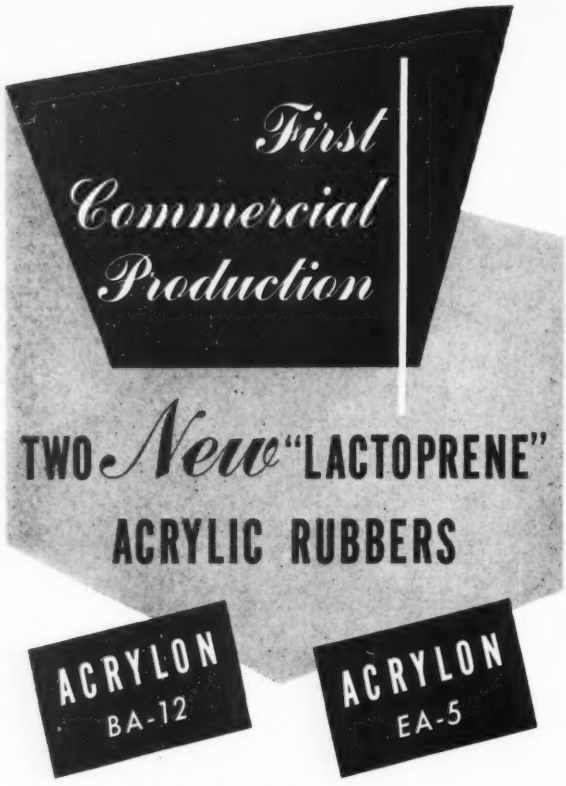

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For further information and samples, write American Monomer Corp., Leominster, Mass.

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LEOMINSTER, MASS.

"Electrostatic Charge and Its Effects on Ozone Resistance of Rubber," H. C. O'Brien, Royston Laboratories, Pittsburgh, Pa., U.S.A.

Ralph Rowzee, vice president and manager of Polymer Corp., Ltd., Sarnia, Ont., Canada, agreed to read a paper before the Institution. To give members and visiting ISO delegates attending the IRI Symposium the opportunity to be present, the lecture was scheduled for the evening of September 27.

Rubber Trade Notes

About 22,000 square yards of the Leeds-Wetherby road are being resurfaced with bitumen mixed with a small quantity of rubber. A trial area on the Selby Road, Leeds, which was similarly treated last year, is giving every satisfaction under heavy traffic.

The second unit of the Avonmouth plant of Philblack, Ltd., is now in operation, and British-produced Philblack A and Philblack O, produced since early May, are now available.

Investors, particularly in rubber-producing companies, are indignant over the government's announcement that legislation will be introduced to limit dividends, for a period of three years, to the average declared for the last two accounting periods up to July 27, 1951. A special correspondent to *India Rubber Journal* seems to voice the general feeling when, in an article stating the position of the rubber industry, he says:[1]

"Inequitable is too mild a description of the Chancellor's proposed new taxation. Viewed in the light of its disproportionate incidence on the rubber companies and on the plantation industry, as against other industries, the new tax basis is an outrage, which no fresh crisis or expediency can justify. . . .

"The rubber industry has suffered much . . . at the hands of predatory governments. The proposed basis for dividend limitation is something that must not be tolerated."

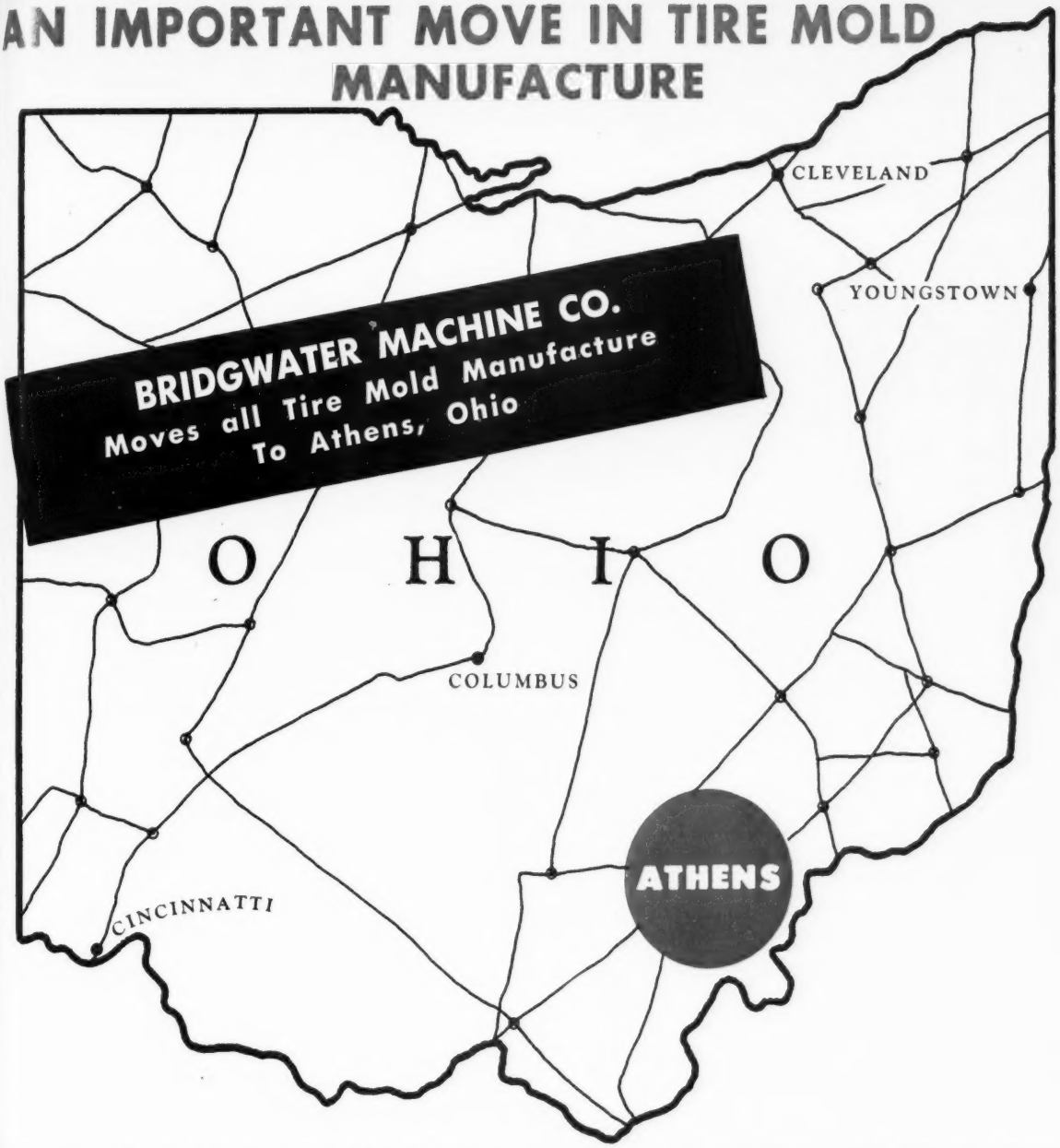
[1] Aug. 4, 1951, p. 8.

EUROPEAN NOTES

According to German sources, Soviet Russia used 264,700 tons of rubber in 1949, including 170,000 tons of domestic synthetic rubber, 7,200 tons of homegrown natural rubber, and 87,500 tons of imported rubber. It is thought that at least 50,000 tons of scrap rubber were also used. Production of synthetic rubber is put at 250,000 tons for 1950 and at 300,000 for the current year.

Among the American scientists who visited Sweden to study Swedish cyclotrons are mentioned H. E. Fritz, W. L. Davidson, and W. L. Semon, all of The B. F. Goodrich Co., Akron, O., U. S. A. The Americans investigated the use of the cyclotron in the manufacture of rubber at the Institute for Nuclear Chemistry, Upsala.

AN IMPORTANT MOVE IN TIRE MOLD MANUFACTURE



Since the early days of the automobile, Bridgwater Machine Co. has been one of the principal manufacturers of tire molds, carrying on this activity as part of our general contract manufacturing operations.

Tire mold manufacture, while contract work, is wholly unrelated to general contract manufacturing — requiring special techniques, special skills and special tools.

Accordingly, when a few years ago it became necessary to expand our mold manufacturing facilities to keep pace with the needs of the tire industry, we established them in a new plant in Athens, Ohio, under the name of Athens Machine Division of Bridgwater Machine Co. We have now centralized and consolidated all our tire mold manufacturing in an enlarged Athens Machine Division plant — the only plant in the world, we believe, devoting itself exclusively to tire mold manufacturing.

The advantages to buyers of tire molds are quickly evident: specialized equipment designed solely for tire mold manufacturing means *lower cost production, quicker delivery;* the higher skill and proficiency developed in personnel devoted exclusively to tire mold manufacture means *highest quality molds.*

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Important!
We are pleased to announce that our production capacity for our MARK® series of vinyl STABILIZERS has been expanded and these products will be more freely available.

Here are 6 outstanding features of this series of vinyl stabilizers.

1. In operation of calenders and extruders at ***high speeds*** and ***high temperatures.***
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FAR EAST

MALAYA

Lockwood in Malaya

Warren S. Lockwood, head of the Natural Rubber Bureau in Washington, D. C., U. S. A., visited Malaya in August on a facts finding mission and also to get the Malayan rubber industry interested in greatly increasing the production of rubber powder. The local press quotes him as having stated that next year the United States would require from Malaya five times as much powdered rubber for roadways as had been sent this year, and that he was convinced that this development was the most promising and revolutionary since the evolution of the tire. At a press conference in Penang he warned that though the industry was not headed for a crisis at any time in the near future, it faced problems in a year or two when stockpiling would have ended while at the same time synthetic rubber production in the United States would be at a high rate.

Mr. Lockwood visited rubber estates in various localities and praised the magnificent job Malayan producers are doing under trying circumstances; he declared that if more Americans came to Malaya to see conditions for themselves, the American attitude would change, and misunderstandings would cease. The Natural Rubber Board, he added, wanted to help America realize that "any government action in future which tends artificially to restrict beyond the recognized requirements of national security a free market for natural rubber could have serious repercussions here and could turn the bastion of democracy in South East Asia into economic chaos."

Hormone Stimulant Increases Latex Yield

Under the name of Stimulex has just come on the market a stimulant claimed to increase normal rubber latex yields by 20%. Stimulex, a combination of plant hormones in an oil base, is the result of researches by G. W. Chapman, research director of Chemara Plantations, Ltd., begun about 14 years ago to discover the causes for the higher yields obtained by planters in Malacca by using cow-dung mixtures. Before being put on the market, the stimulant was tested for four years on estates by Guthrie & Co., now sole agent and distributer of Stimulex.

In the course of his work on hormones, Dr. Chapman found that one of the causes of differences between yields of trees in an area was the variation in quantity of natural hormones present in the different trees.

The new stimulant is applied with a brush on previously scraped bark, below the tapping cut.

Experienced European Planters Scarce

In certain districts rubber growing companies are finding great difficulty in replacing older and more experienced European planters who have retired or are due to retire. Despite many inducements offered, very few of the right type of young men appear willing to take up planting careers in Malaya, it is said. In Perak the situation has led to an increasing number of promotions of Asians with long years of service on plantations to positions formerly held by Europeans. The Malayan Estates Asian Staffs Union is reportedly striving for the adoption of a general policy of appointing Asian members of the staff to these higher positions. Incidentally, the Union is also attempting to get better terms of employment for its members; it is aiming at increased provident fund contributions, bonuses, and a profit-sharing scheme.

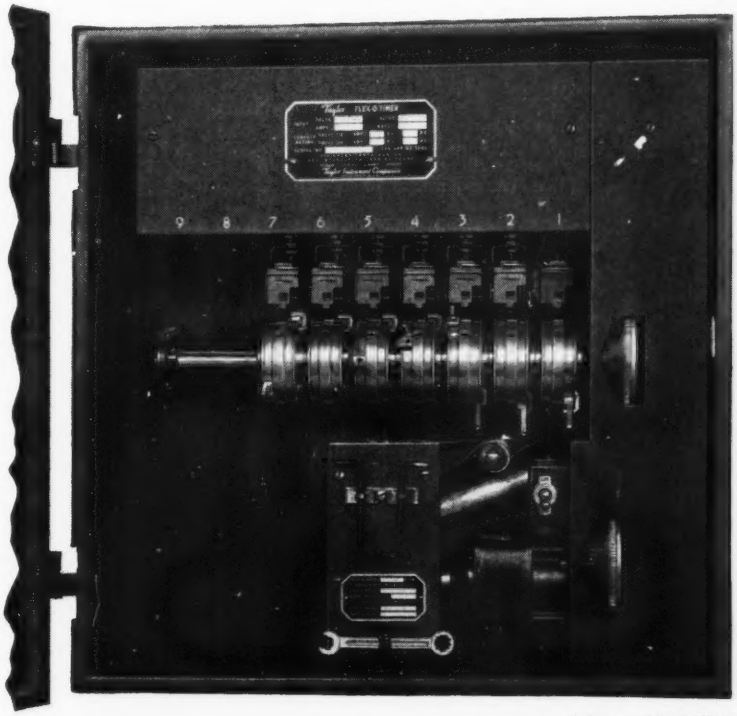
Other Malayan Rubber Activities

A leading Chinese manufacturer of natural rubber goods has just imported 25 tons of synthetic rubber from which he plans to make oil-resistant articles. This manufacturer feels that the use of synthetic rubber in this field has a bright future in Malaya.

4 NEW ADVANTAGES IN FLEX-O-TIMER*

Time Cycle Controllers

ONE OF 5 STANDARD TAYLOR MODELS RE-DESIGNED FOR GREATER ADAPTABILITY



YES, we've completely re-designed the famous Taylor Flex-O-Timers. Result—a whole new family of Taylor Time Cycle Controllers precision built to meet your strictest processing requirements! For instance, you get these four big advantages:

1. **Greater Flexibility.** Wide range of cycle bands from 14 seconds to 540 minutes available to meet all time cycle controller requirements. Cycle duration may be either fixed or varied. Up to 18 control functions may be contained in one instrument.

2. **Newly Designed, Segmented Drum.** Individual aluminum segments mounted on a central shaft. One segment for each control function. Provision for number of actuating pins needed to operate a function as many as 15 times. Readily interchangeable cycle drum assemblies enable you to preset cycles for applications where components within cycle vary periodically.

3. **Unit Parts Easier to Reach.** Universal dust-tight case has hinged door with bayonet-action latch. All unit assemblies front-mounted—easy to reach when you open door. Thus, terminal strips, air valves and switches, snap-operators, cycle drum, solenoid motor and gear train can be easily removed for repair or replacement. Terminals, control functions and gears are all plainly numbered so that connections or gear train changes can be made in the field.

4. **Easier and Simpler Adjustments.** Actuating pins of precision die-cast aluminum are easy to remove and set. Fingertip adjustment of speed dial gives a range of adjustments of 80 to 1.

Of course, the Flex-O-Timer shown here is just one of the family!

(1) It controls a group of as many as 9 pneumatic or 9 electrical functions (or any combination of each)—with all the intermediate steps within a function automatically controlled for the duration of the manufacturing operation. Particularly adaptable for such applications as *tire presses or horizontal and vertical vulcanizers.*

* Registered Trade-Mark

Meet the other members, too!

(2) The 10 to 18 function Flex-O-Timer for complex control according to a predetermined schedule and over a specifically timed period. Perfect for such applications as *horizontal and vertical vulcanizers.*

(3) The 1 to 5 function Flex-O-Timer for simpler applications like *belt presses, mechanical rubber products presses* or *tire presses.*

(4) The 1 to 3 function Flex-O-Timer—specifically developed for *tube molding* presses.

(5) The single function Flex-O-Timer . . . particularly useful for *condensate removal* applications.

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Write today for the new Taylor Catalog 98154. It tells the whole new and improved Flex-O-Timer story. Just one more way we're ready to help you keep quality up and costs down with Taylor Accuracy. Taylor Instrument Companies, Rochester, New York, and Toronto, Canada. *Instruments for indicating, recording and controlling temperature, pressure, humidity, flow and liquid level.*

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A second strip of rubberized road is reportedly to be laid in Kuala Lumpur the end of this month. It is understood that a rubber expert from England, A. R. Smee, of the British Rubber Development Board, will be visiting Malaya at that time and will supervise the laying of a stretch of road on a main street of Kuala Lumpur.

The rubber boom has led smallholders to increase the planting of improved material. In East Pahang they are said to be preparing to plant 78,000 clonal stumps bought from agricultural stations which have raised seedlings from clonal seed supplied by the Rubber Research Institute. It is felt at the Department of Agriculture that the present rate of new planting by smallholders may continue for some years.

According to a pro-Communist Hong Kong paper, about 700 Chinese deported from Malaya in recent months have answered the call of the People's Government and have registered for service on rubber estates on Hainan Island. Malayan papers indicate that Chinese planters in Singapore consider the report part of a Communist publicity stunt to attract rubber planters to China. They surmise that what has actually happened is that Malayan Chinese who are now jobless in China have been press-ganged and those with tapping experience have been sent to Hainan. The island is said to produce about 200 tons of rubber annually.

INDONESIA

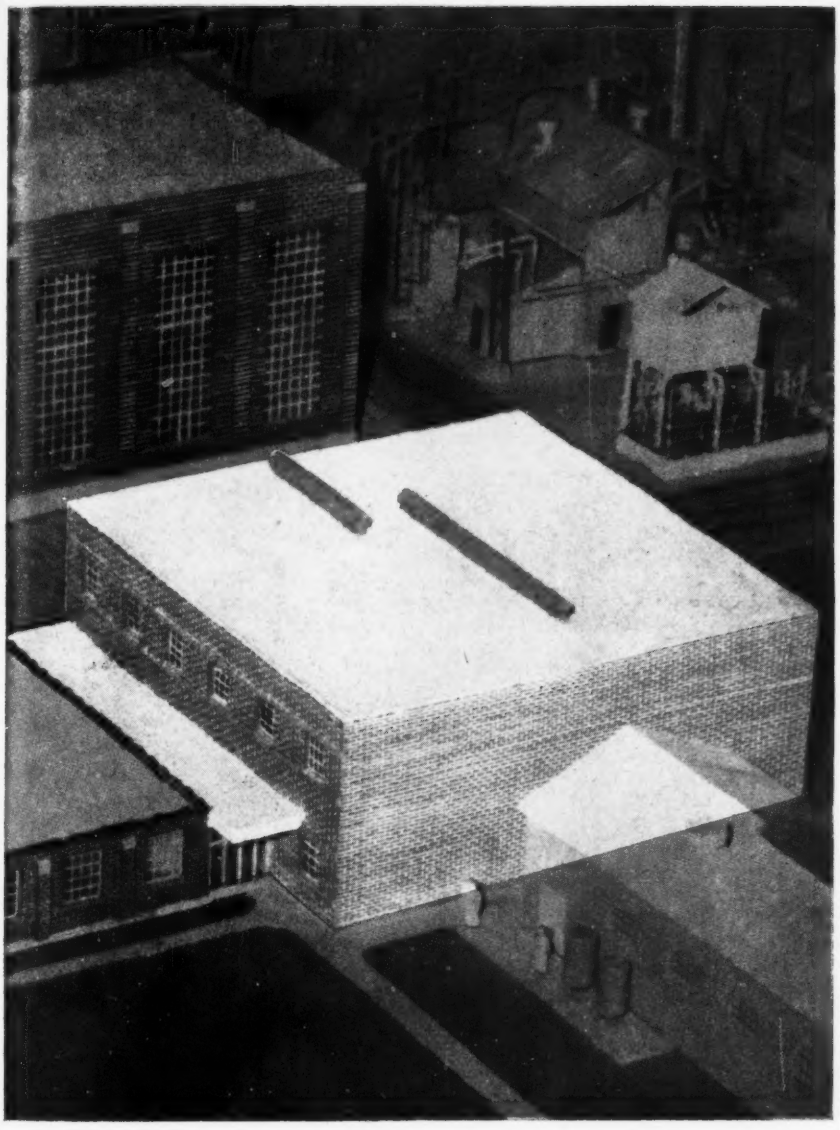
Latest reports indicate an accentuated flight of capital and technical experts from Indonesia. Several European companies, including those engaged in rubber, are said to be withdrawing at least part of their capital for investment outside of Indonesia. Recently Rubber Plantation Co. "Amsterdam," one of the largest Dutch rubber growers in Indonesia, announced its decision to extend activities to other countries. Rumor has it that the company intends to operate rubber and oil palm estates in British East Africa.

This trend is not surprising when consideration is given to the unsettled conditions, especially in the outlying districts of Indonesia. *Bergcultures*[1] mentions a particularly vicious case of banditry. A very large gang, estimated at 500 to 800 men, whose arms included four Brenn guns, raided an estate south of Sukabumi, Java, killing six policemen, a Dutch planter, and several Javanese. Thieving and illicit tapping also plague estates. The loss and damage caused by rubber thefts and exhausting tapping procedures are pictured by a returned Sumatra rubber planter in a recent interview.[2] Rubber thefts, particularly on remote estates, have reached alarming proportions, this spokesman related; in some places as much as 60% of the normal crop was being stolen; all employes, but chiefly the tappers, seem to participate in this racket.

More dangerous to estates than stealing is sneak tapping, fre-

[1] June 16, 1951, p. 207.
[2] *India Rubber J.*, July 21, 1951, p. 9.

Intricate Shapes
SEE PAGE 4



RUBBER CHEMICALS LABORATORY addition at Monsanto's Nitro, West Virginia, plant as it will appear when completed next year.

Monsanto expands rubber research

Monsanto, a leader in rubber chemicals research for three decades, is extending its activities in this field with the construction of a substantial addition to its laboratories in Nitro, West Virginia. The new facilities, which will be in operation in 1952, will more than double space in its rubber research laboratories in Nitro and in Akron, Ohio. The number of scientists and technicians employed in the laboratories will be substantially increased.

Monsanto research has made regular important contributions to rubber progress in the last 30 years, including developments of value in processing of natural, synthetic and reclaimed rubber.

Research facilities of Monsanto are available to the rubber industry. If you have a problem in rubber compounding or rubber research, we hope you will feel free to discuss it with us. For further information, get in touch with MONSANTO CHEMICAL COMPANY, Rubber Service Department, 920 Brown Street, Akron 11, Ohio.

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Santoflex* B
Santoflex BX
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Santoflex AW
Santowhite* Crystals
Santowhite MK
Santowhite L

Aldehyde Amine Accelerators
A-32
A-77*
A-100

Mercapto Accelerators
Santocure*
El-Sixty*
Ureka* C
Ureka Base
Mertax (Purified Thiotax)
Thiotax (2-Mercapto benzothiazole)
Thiofide* (2,2′ dithio-bis benzothiazole)

Guanidine Accelerators
Diphenyl Guanidine (D.P.G.)
Guantal*

Ultra Accelerators for Latex, Etc.
R-2 Crystals
Pip-Pip
Thiurad* (Tetra methyl thiuram disulfide)
Ethyl Thiurad (Tetra ethyl thiuram disulfide)
Mono Thiurad (Tetra methyl thiuram mono sulfide)
Methasan* (Zinc salt of dimethyl dithiocarbamic acid)
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Butasan* (Zinc salt of dibutyl dithiocarbamic acid)

Wetting Agents and Detergents
Areskap* 50
Aresklene* 375
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Special Materials
Thiocarbanilide ("A-1")
Santovar*-A
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Reodorants

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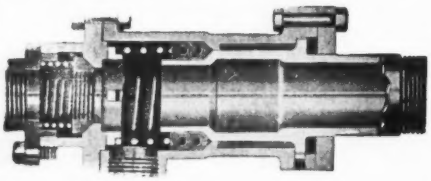
CHEMICALS for PLASTICS

SERVING INDUSTRY...WHICH SERVES MANKIND

Talk About Service . . .



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quently carried out at night by poachers and squatters who hack at trees, including large numbers of the best Sumatra budgrafts, at a rate that will make them useless for anything but firewood within one or two years. However, one of the most shocking examples of reckless over-tapping and mismanagement cited was a large, formerly high-class estate of selected rubber, now being run by a government-appointed administration. Illicit tapping is frequently brazenly overt, and there seems to be no means—as yet—of stopping it.

On the other hand the interviewee found natives everywhere better off than ever before, and he holds that this prosperity has curbed the spread of Communism.

Other good auguries for the future of Indonesia mentioned were the growing appreciation among the country's new governors of European capital and technical skill as factors in the development of the country's agriculture and industries, and the real anxiety of individual officials to make good and earn the approbation of the world. Sumatra's East Coast is cited as one of the bright spots. However, the final impression left by the interview is of a country where the good will and good intentions of officials and at least a part of the population are neutralized by the inability of those in authority to inspire the confidence and respect necessary for the maintenance of law and order.

JAPAN

A substantial increase in the production of polyvinyl chloride may be looked for shortly in Japan. The Mitsui Chemical Industry Co. announced in January, 1951, that it had opened a new plant in Nagoya. This plant, the largest in operation at the time, is expected to be able to produce about 150 metric tons a month by March, of which 50 tons were to be processed at the plant into sheets and wire-insulating material, with the remainder to be sold to other processing companies.

The Mitsubishi Chemical Co. was reported to be planning to establish a 250-ton vinyl chloride plant. Finally, as already reported, Goodrich in combination with Japanese interests, is also to produce polyvinyl chloride in Japan.

BURMA

Despite unsettled conditions in Burma, rubber exports in the fiscal year 1949-50 increased to 10,016 tons from 5,647 tons in 1948-49. These figures compare with a yearly average of 7,835 tons in the five-year period, 1937-41. However the rise in output is reportedly largely the results of overtapping.

AUSTRALIA

Dunlop Rubber (Australia), Ltd., is doubling its nominal capital to £12,000,000 by the creation of 6,000,000 new shares of £1 each.

Industrial Chemical Industries of Australia and New Zealand plans to make Australia self-sufficient in polyvinyl chloride and to this end will spend £3,000,000 on expanding production at Botany Bay, New South Wales, to 6,000 tons a year within the next three years.

ISRAEL

The General Tire & Rubber Co. of Israel, which is a subsidiary of the Akron company and is jointly owned by American and Israeli interests, begins manufacturing tires in November. Production is to be sufficient to cover all home demands and to leave a surplus for export. American and American-trained experts will introduce the latest production methods at the company's plant, which will employ about 300 workers. Provision has been made to permit eventual expansion of the factory with a minimum outlay of foreign currency.

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Editor's Book Table

BOOK REVIEWS

"Styrene." A. L. Ward and W. J. Roberts. Interscience Publishers, Inc., 250 Fifth Ave., New York 1, N. Y. Paper, 6 by 9 inches, 131 pages. Price, $3.50.

This booklet is a complete revision and extension of the section on styrene contained in Section I of "Monomers," published in 1949. While retaining the same general organization of the previous section, the expansion in coverage of the subject by this booklet is exemplified by the increase in number of pages from 66 to 131 and in number of bibliography references from 80 to 201.

The subject matter is divided into seven sections. The first section is introductory in nature; while the second discusses preparation of styrene, both in the laboratory and on a commercial scale. Purification is the subject of the third section, which covers the removal of impurities, effects of impurities, and the analysis of monomeric styrene. Section IV deals with the care and handling of monomers, with information on toxicity, stabilization, and inflammability. Physical and thermodynamic properties of styrene are discussed in Section V; while detailed information on chemical properties is given in the sixth section. The final section presents comprehensive information on the homopolymerization and copolymerization of styrene.

"Punched Cards, Their Applications to Science and Industry." Robert S. Casey and James W. Perry. Reinhold Publishing Corp., 330 W. 42nd St., New York 18, N. Y. Cloth, 6 by 9 inches, 514 pages. Price, $10.

The accumulation of scientific and technical information, even in files of modest size, soon becomes unwieldy and presents difficulties in quickly finding any desired data. It has been found that considerable improvement in the speed and ease of finding information in files can be achieved by use of punched cards, either manually or machine sorted. This book, directed principally to the needs of the individual scientist or technologist, endeavors to present sufficient information to permit the application of punched card techniques to individual problems. At the same time a review of present knowledge and experience with punched cards is given to stimulate better use of available devices and the development of improved devices better suited to practical needs.

The book consists of 30 chapters, written by various authorities, and grouped into five sections. The first section, containing four chapters, is introductory and elementary in nature and presents sufficient information to permit an individual to set up and use a simple punched card system. The second section, comprising 14 chapters, consists of case histories of punched card applications, illustrating what has already been accomplished. The 10 chapters forming the third section are general and theoretical in nature; while the chapter forming the fourth section is a study of the role punched cards and related devices may eventually play in coping with information problems. The concluding section consists of a chapter giving a bibliography of 276 references on the use of punched cards for scientific information. Both subject and author indices are appended to the book.

NEW PUBLICATIONS

"Calcium Carbonates and Calcium Oxides." Whittaker Clark & Daniels, Inc., 260 W. Broadway, New York 13, N. Y. 65 pages. This data book is divided into four sections covering natural sugar calcites, imported natural calcium carbonates (whitings), precipitated calcium carbonates, and calcium oxides (limes). Compositions and properties of the company's products are given, together with detailed descriptions of uses.

"Indonex Plasticizers in Extruded Butyl Automotive Compounds." Circular No. 13-45. Indoil Chemical Co., 910 S. Michigan Ave., Chicago 80, Ill. 4 pages. Formulations and test data are given to show the advantageous results of using Indonex plasticizers in a series of butyl compounds designed for extruded bumpers and weather stripping.

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"Plastics Extrusion Equipment Complete for Immediate Installation." National Rubber Machinery Co., 47 W. Exchange St., Akron 8, O. 4 pages. This illustrated bulletin describes the company's plastics extruders and auxiliary equipment, including ½-inch extruders, the two-stage extruder, special dies and haul-offs for film, wire and cable covering equipment, and special equipment for saran extrusion.

Publications of the British Rubber Producers' Research Association, 48 Tewin Rd., Welwyn Garden City, Herts., England.

No. 141. **"Radical Mechanisms in Saturated and Olefinic Systems.** Part I. Liquid-Phase Reaction of the *Tert.*-Butoxy Radical with Olefins and with Cyclohexane. Part II. Disubstitutive Carbon-Carbon Cross-Linking by *Tert.*-Alkoxy Radicals in Isoprenic Olefins and Rubber. Part III. The Reaction of Hydroxyl Radicals with Olefins." E. H. Farmer and C. G. Moore. **"The Thermal Decomposition of Dihydroascaridole"** and "The Reaction of Di-*Tert.*-Butyl Peroxide with Butan-2-One and Cyclohexanone." C. G. Moore. 28 pages. In the paper on "radical mechanisms." Part I deals with a study of the liquid phase reaction at 140° C. of *tert.*-butoxy radicals with monoolefins, alkylbenzenes, and cyclohexane. Part II extends the reaction study of these radicals to a series of low molecular polyisoprenes and rubber hydrocarbon. Part III gives data on the liquid phase reaction of *tert.*-butyl hydroperoxide with monoolefins. The note on dihydroascaridole shows the material to conform in mode of decomposition to its acyclic analogs to form a 1, 4-diketone. The second note shows how the hydrogenative reactivity of *tert.*-butoxy radicals has been used to "dehydropolymerize" cyclic and acyclic monoketones.

No. 148. **"Adsorbed Films at Oil-Water Interfaces."** E. C. Cockbain and A. I. McMullen. 10 pages. The adsorption of potassium laurate and sodium dodecyl sulfate at benzene-water and n-decane-water interfaces has been calculated from interfacial tension data, and the results compared with the surface concentrations of typical spread monolayers at the same boundary pressures.

"Fisher Gas-Analysis Manual." Maryan P. Matuszak. Fisher Scientific Co., Pittsburgh 19, Pa. 60 pages. This fourth revised edition of the company's reference manual on gas analysis gives up-to-date information on the theory of analysis and the procedures involved, instructions on maintaining and operating the equipment; and illustrated descriptions of the company's gas analysis apparatus.

"Natural Rubber and You." Natural Rubber Bureau, 1631 K St. N. W., Washington 6, D. C. 30 pages. Statistics and interesting details on natural rubber are presented in this new edition of the Bureau's booklet. Profusely illustrated, the publication gives a history of natural rubber; statistics on production, consumption, and prices; and photo stories on life on a typical Malayan rubber plantation and the life of a typical Asian rubber farmer.

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"Ortho-Nitrobiphenyl, Plasticizer and Chemical Intermediate." Technical Bulletin No. 0-78. Monsanto Chemical Co., St. Louis, Mo. 12 pages. Extensive data are presented on the properties and applications of ortho-nitrobiphenyl showing the material to be a good general-purpose plasticizer for most types of plastic, lacquer, and adhesive formulations. The material is also suggested as an intermediate for the manufacture of dyestuffs.

"A Practical Manual of Rubber Hardness Testing." A. L. Soden. Maclaren & Sons, Ltd., Stafford House, Norfolk St., London W.C.2, England. Board, 6 by 8¾ inches, 49 pages. Price, $1.25 in U.S.A. and Canada. This book, a reprint of a series of articles published early this year in *India-Rubber Journal,* surveys the whole field of rubber hardness testing. After discussing the theoretical aspects, the author explains the various standard tests and their instruments and deals with the factors affecting instrument design and use. A bibliography of references is included, together with appendices giving hardness conversion values for the different tests.

"Recommendations for Reduction of Rubber Damage and Shortage Losses." American Institute of Marine Underwriters, 99 John St., New York, N. Y. August 1, 1951. 8 pages. As a result of work on various phases of cargo loss prevention, the American Institute of Marine Underwriters has compiled recommendations for better processing on estates and in milling factories, improved shipper practices, improved handling and stowage by carrier at port of loading, and for increased efficiency in discharge, pier storage, and delivery practices. Cooperation of all interested parties in the adoption of these recommendations is requested by the Institute.

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A-41

MARKET REVIEWS

CRUDE RUBBER

STOCKPILE purchasing of rubber by GSA in the foreign market was at a standstill during the period from August 16 to September 15 in view of high market prices. The Senate subcommittee report calling for speedier stockpiling of rubber resulted in a sharp price rise in the foreign markets, but this rise was counteracted by a sharp drop in prices following a statement on September 12 by GSA Administrator Larson that the government stockpile "is far from being so low as to require us to follow the rubber market in any upward spiral." In addition Senator Johnson, chairman of the preparedness subcommittee, stated that we should not embark on a "wild buying spree" to attain the stockpile goal. Both Larson and Johnson advocated tougher restrictions on crude rubber consumption to make more rubber available for the stockpile, and there were indications that the subcommittee might call upon NPA to cancel any plans to loosen up its controls next January.

On August 27 the RFC announced an increase of 1½¢ a pound in the selling price of GR-S, to take effect with September deliveries to manufacturers. The current program to expand GR-S annual output from 760,000 to 860,000 long tons will require use of high cost alcohol-derived butadiene. Most of the 100,000-ton increase will be attained by using alcohol butadiene, which results in a GR-S costing 35-40¢ a pound. The new selling price, 26¢ a pound for standard GR-S and most grades of GR-S latex, is derived by striking an average of the costs involved in producing the rubber from both petroleum- and alcohol-derived butadiene. The new price should add 15-16.5¢ per tire to the manufacturer's cost and may result in higher tire retail prices if the increase is passed along. The price of butyl rubber remained unchanged at 20.75¢ a pound, and no expansion in butyl rubber output is underway.

Latices

ON AUGUST 29 the NPA revised the M-2 Order, effective September 1. This revision, among other changes, terminated controls on the consumption of natural rubber latex. These usage limitations had no real meaning during the past few months since consumption has run well below NPA's permitted levels. In view of the continuing relatively high prices for *Hevea* latex, no great increase in consumption is expected under the decontrol.

The discontinuance of "sole importation" of *Hevea* latex by GSA, while urged by the domestic latex industry, is recognized as a more complicated problem. According to Arthur Nolan, Latex & Rubber, Inc., writing in the September issue of *Natural Rubber News*, the industry believes that the government can now return the whole problem of latex importation to private hands.

GSA has announced that the 64¢ per pound, dry weight, selling price for bulk *Hevea* latex will continue through September. Any price reduction in October is considered problematical, since much depends on the government decision in the latex problem as well as crude rubber prices in the foreign markets during September. On the basis of current conditions and handling costs, any reduction in latex prices would be slight in the opinion of market observers.

June imports of *Hevea* latex were 4,692 long tons, dry weight; consumption, 3,142 long tons; and private industry stocks at the end of the month, 5,296 long tons. July imports are estimated at 4,000 long tons; consumption, 2,900 long tons; and privately held month-end stocks, 4,800 long tons.

Effective September 1, GSA advanced the selling price of GR-S low solids latex to 26¢ per pound, dry weight, and that of concentrated types to 27.75¢ per pound. While production and consumption of GR-S latex declined in June and July, demand is expected to continue good and increase as further quantities of "cold" latex are made available.

RECLAIMED RUBBER

THE break in the reclaimed rubber market, first evident late in July, became even more apparent during the period from August 16 to September 15. Preliminary estimates of reclaim sales in September indicate a level of business 30% below that of August. The most important factor behind this decline in demand is the general slump in rubber goods manufacturing, particularly in tires which have been affected by the government-ordered curtailment of automobile production.

In general, the reclaim industry is adhering to the pricing schedule set forth in CPR 58, but peel reclaim is reported to be selling at 1¢ a pound, or 0.5¢ below the ceiling price for this grade. The ceiling price order on scrap rubber has had the effect of stabilizing the market and releasing quantities of light colored scrap which had previously been held back for the highest bidders. As a result, certain grades of light-colored reclaims, including tube, carcass, and mechanical types, are now available for the first time in several years.

A new market for reclaim has developed as the result of laws passed by five states requiring rubber flaps on trucks of a certain minimum size. These flaps are rather large, about 24 by 31 inches and about ¼-inch thick, and weigh about 12 pounds, and may be expected to contain fully as much reclaim as an automobile mat.

Final June and preliminary July statistics on the domestic reclaimed rubber industry are now available. Final June figures show a production of 33,509 long tons; imports, 20 long tons; consumption, 30,999 long tons; exports, 1,416 long tons; and month-end stocks, 40,268 long tons. Preliminary figures for July show a production of 30,119 long tons; consumption, 25,728 long tons; exports, 1,416 long tons; and month-end stocks, 44,653 long tons.

A study of rubber consumption data released by NPA shows that the consumption ratio of reclaimed to new rubber fell off in May-July, but the ratio in transportation items has remained unchanged since last November. Since the consumption ratio of GR-S to new rubber in transportation items has risen steadily during this time, it is obvious that the GR-S has been replacing the higher priced natural rubber in these items. The declining ratio of reclaim consumption to new rubber can be traced, therefore, to lessening use of reclaim in non-transportation items.

SCRAP RUBBER

LITTLE or no activity was reported in the scrap rubber market during the period from August 16 to September 15 despite a further easing of prices to levels 8/8 per net ton below ceilings for tires and tire parts, and 2.5-3.5¢ per pound below ceilings on scrap tubes. Demand from reclaimers was said to be almost nonexistent as the result of large mill inventories and declining reclaim sales.

The export market for scrap was also depressed. Japan, formerly one of the largest purchasers of scrap rubber in the domestic market, was reported to be doing little or no buying because of a lack of dollars.

The lower scrap rubber prices and the freight rate increases, effective August 28, have resulted in almost complete cessation of scrap shipments from outlying areas. The new freight rates embody increases of 9% to eastern railroads and 6% to southern and western railroads. Since scrap rubber no longer presents any incentive to such outlying dealers, particularly in the South, many are said to be turning to the collection of other scrap materials.

Following are dealers' selling prices for scrap rubber, in carload lots, delivered to mills at the points indicated:

	Eastern Points	Akron O.
	(Per Net Ton)	
Mixed auto tires	$19.00	$20.00
Peelings, No. 1	42.50	42.50
3	27.50	30.00
	(¢ per Lb.)	
Black inner tubes	8	8
Red passenger tubes	11/11.5	11/11.5

RAYON

TOTAL rayon shipments by United States producers to domestic consumers during August amounted to 98,200,000 pounds, a decline of 8% from the July figure. August shipments of viscose high-tenacity rayon yarn reached 29,300,000 pounds, an increase of 900,000 pounds over the preceding month's figure. Rayon stocks held by producers at the end of August were 42,200,000 pounds, of which 1,800,000 pounds were of high-tenacity yarn.

No changes were made in rayon tire

Dependable Performance

We Deliver it in Plasticizers, too!

Many of today's most popular and versatile plastics acquire their improved flexibility and general usefulness from the *plasticizers* used in compounding them. That's why the makers of plastic products—like your shower curtain or garden hose—must have plasticizers of high, uniform quality. More and more of these compounders are specifying Pittsburgh PX Plasticizers because we have the advantage of controlling every step of our production from coal to finished product . . . an important factor that results in plasticizers of unexcelled quality and uniformity. These same advantages that stem from our unique position as a *basic* and *integrated* manufacturer are also reflected in the dependable and continuing supply of the other basic Pittsburgh Chemicals—such as benzene, xylene, phthalic anhydride, cresols and pyridine.

PX-104	DiButyl Phthalate
PX-108	DiIsoOctyl Phthalate
PX-138	DiOctyl Phthalate
PX-208	DiIsoOctyl Adipate
PX-404	DiButyl Sebacate
PX-408	DiIsoOctyl Sebacate
PX-658	TetraHydroFurfuryl Oleate
PX-917	TriCresyl Phosphate

W&D 3856

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COKE & CHEMICAL CO.

COKE • CEMENT • PIG IRON • COAL CHEMICALS • ACTIVATED CARBON • AGRICULTURAL CHEMICALS • PROTECTIVE COATINGS • PLASTICIZERS

yarn and fabric prices during the period from August 16 to September 15, and current prices follow:

Rayon Prices

Tire Yarns

1100/ 480	$0.62/	0.63
1100/ 490		.62
1150/ 490		.62
1650/ 720	.61/	.62
1650/ 980		.61
1900/ 980		.61
2200/ 960		.61
2200/ 980		.60
4400/2934		.63

Tire Fabrics

1100/490/2		.72
1650/980/2	.695/	.73
2200/980/2		.685

COTTON AND FABRICS

New York: Cotton Exchange Week-End Closing Prices

Futures	July 28	Aug. 18	Aug. 25	Sept. 1	Sept. 8	Sept. 15
Dec.	34.92	34.60	34.85	34.41	34.51	34.93
Mar.	34.92	34.67	34.92	34.51	34.72	35.03
May	34.89	34.59	34.89	34.52	34.70	35.06
July	34.37	34.17	34.49	34.04	34.29	34.73
Oct.	32.85	32.90	33.28	32.95	33.24	33.59
Dec.	32.73	32.76	33.16	32.89	33.20	33.53

COTTON prices moved irregularly on the New York Cotton Exchange during the period from August 16 to September 15. Prices rose at the start of the period on a wave of price fixing stemming from the sharp declines of the preceding month. During the last week of August prices again fell off, but recovered at the end of the period. Despite the price fluctuations, market undertones were steadier because of reports that farmers were withholding their cotton while awaiting higher prices, indications of progress by Cotton Bloc Senators in obtaining a stockpiling program, and renewed official predictions of heavy exports in the current season.

The 15/16-inch middling cotton spot price began the period at 35.70¢, rose to a high of 36.15¢ on August 22 and 23, dropped to a low of 35.05¢ on September 4 and 5, and finally rose to end the period at 35.70¢. October futures were priced at 34.48¢ on August 16, reached a high of 34.90¢ on August 22 and 23, declined to a low of 34.24¢ on Septemer 4 and 5, and closed the period at 34.89¢.

Fabrics

Price reductions in all cotton gray goods constructions late in August and early in September resulted in a definite improvement in sales. Substantial quantities of numbered, army, and enameling ducks were sold into the fourth quarter. Hose and belting ducks, chafer fabrics, sateens, osnaburgs, and broken twills were also reported to be selling well during the second week in September. Some mills estimated that more trading on these fabrics took place during that week than the total of the preceding few weeks. Trading in print cloths, while showing some improvement, continued to be limited to relatively small lots, mostly for nearby delivery.

Cotton Fabrics

Drills

59-inch 1.85-yd	*yd.*	$0.40
2.25-yd		.3375

Ducks

38-inch 1.78-yd. S. F.	*yd.*	.415
2.00-yd. D. F.	*yd.*	.38
51.5-inch, 1.35-yd. S. F.		.5475
Hose and belting		.72

Osnaburgs

40-inch 2.11-yd.	*yd.*	.27
3.65-yd	*yd.*	.17

Raincoat Fabrics

Print cloth, 38½-inch, 64x60		.15
Sheeting, 48-inch, 4.17-yd		.245
52-inch 3.85-yd		.265

Other Fabrics

Headlining, 58-inch 1.35-yd., 2-ply	*yd.*	.56
64-inch, 1.25-yd. 2-ply		.66
Sateens, 53-inch 1.32-yd		.6575
58-inch 1.21-yd		.7175

Chafer Fabrics

14-oz./sq. yd. Pl.	*lb.*	$0.76	/ $0.78
11.65-oz./sq. yd. S.		.70	
10.80-oz./sq. yd. S.		.73	/ .74
8.9-oz./sq. yd. S.		.75	/ .775

Tire Cords

K. P. std., 12-3-3	*lb.*	nom.
12-4-2		.82

Dividends Declared

Company	Stock	Rate	Payable	Stock of Record
American Hard Rubber Co.	Com.	$0.50	Sept. 29	Sept. 24
	7% Pfd.	1.75 q.	Sept. 29	Sept. 24
Armstrong Rubber Co.	A & B Com.	0.50 q.	Oct. 1	Sept. 14
	4¾% Pfd.	0.59⅜ q.	Oct. 1	Sept. 14
Crown Cork International Corp.	Class A	0.25 q.	Oct. 1	Sept. 12
Denman Tire & Rubber Co.	Com.	0.10	Sept. 28	Sept. 18
		0.05 extra	Sept. 28	Sept. 18
	Pfd.	0.12½ q.	Sept. 28	Sept. 18
Dewey & Almy Chemical Co.	Com.	0.30	Sept. 20	Sept. 13
Faultless Rubber Co.	Com.	0.25	Oct. 1	Sept. 20
		2% Stock	Nov. 1	Sept. 20
Firestone Tire & Rubber Co.	Com.	1.50	Oct. 20	Sept. 18
General Electric Co.	Com.	0.75	Oct. 1	Sept. 21
General Tire & Rubber Co.	4¼% Pfd.	1.06¼ q.	Sept. 28	Sept. 20
	3¾% Pfd.	0.93¾ q.	Sept. 28	Sept. 20
	3¼% Pfd.	0.81¼ q.	Sept. 28	Sept. 20
B. F. Goodrich Co.	Com.	.50	Sept. 29	Sept. 7
	$5.00 Pfd.	1.25 q.	Sept. 29	Sept. 7
Goodyear Tire & Rubber Co. of Canada, Ltd.	Com.	1.00	Sept. 29	Sept. 10
Hewitt-Robins, Inc.	Com.	0.40 q.	Sept. 15	Aug. 31
Jenkins Bros.	Fdrs. Com.	1.00	Sept. 28	Sept. 20
	Non. Vot. Com.	0.25	Sept. 28	Sept. 20
Jenkins Bros., Ltd.	Com.	0.25	Sept. 29	Sept. 14
I. B. Kleinert Rubber Co.	Com.	0.25	Sept. 12	Aug. 27
Mansfield Tire & Rubber Co.	Com.	0.25 q.	Sept. 20	Sept. 10
		0.25 extra	Sept. 20	Sept. 10
	6% Pfd.	0.30 q.	Oct. 1	Sept. 15
Minnesota Mining & Mfg. Co.	Pfd.	1.00	Sept. 12	Aug. 22
	Com.	0.25	Sept. 12	Aug. 22
O'Sullivan Rubber Co.	5% Pfd.	0.25	Oct. 1	Sept. 15
	Accum.	0.25	Oct. 1	Sept. 15
Plymouth Rubber Co.	Com.	0.12½	Sept. 15	Aug. 31
Rome Cable Corp.	Com.	0.25	Oct. 1	Sept. 12
	Pfd.	0.30 q.	Oct. 1	Sept. 12
Thermoid Co.	Com.	0.20	Sept. 28	Sept. 14
Union Asbestos & Rubber Co.	Com.	0.25 q.	Oct. 1	Sept. 10

OBITUARY

John P. Roberts

JOHN P. ROBERTS, 43, assistant general manager of The Timken Roller Bearing Co. service sales division, Canton 6, O., was killed in an automobile accident near Spruce Pine, N. C. on September 19. P. T. Ancarrow, Atlanta division manager of the company, and W. L. Walthall, a company salesman, were seriously injured in the same accident. The men were calling on accounts in the Atlanta territory when the accident occurred.

Mr. Roberts, who started with Timken in September, 1935, began his career in the Pittsburgh warehouse and progressed through the organization to salesman in the Pittsburgh district, branch manager in the Minneapolis territory, and in 1945 was named assistant general manager of the service sales division.

He was a member of the Calvary Presbyterian Church.

He is survived by his wife and a five-year-old daughter.

Funeral services were held at Schneeberger Funeral Home, September 22.

Clarence J. Welch

CLARENCE J. WELCH, 62, manufacturers' sales representative for Kelly-Springfield Tire Co. since 1941, died September 13 in a New York, N. Y., hospital.

A native of Kalamazoo, Mich., Mr. Welch lived in New York, having been connected with the rubber industry here for 30 years.

He was a member of the Detroit Athletic club and a graduate of Notre Dame University.

Mr. Welch is survived by a wife, a daughter, and two sisters.

A Requiem Mass was sung September 15 at the Blessed Sacrament Church, New York.

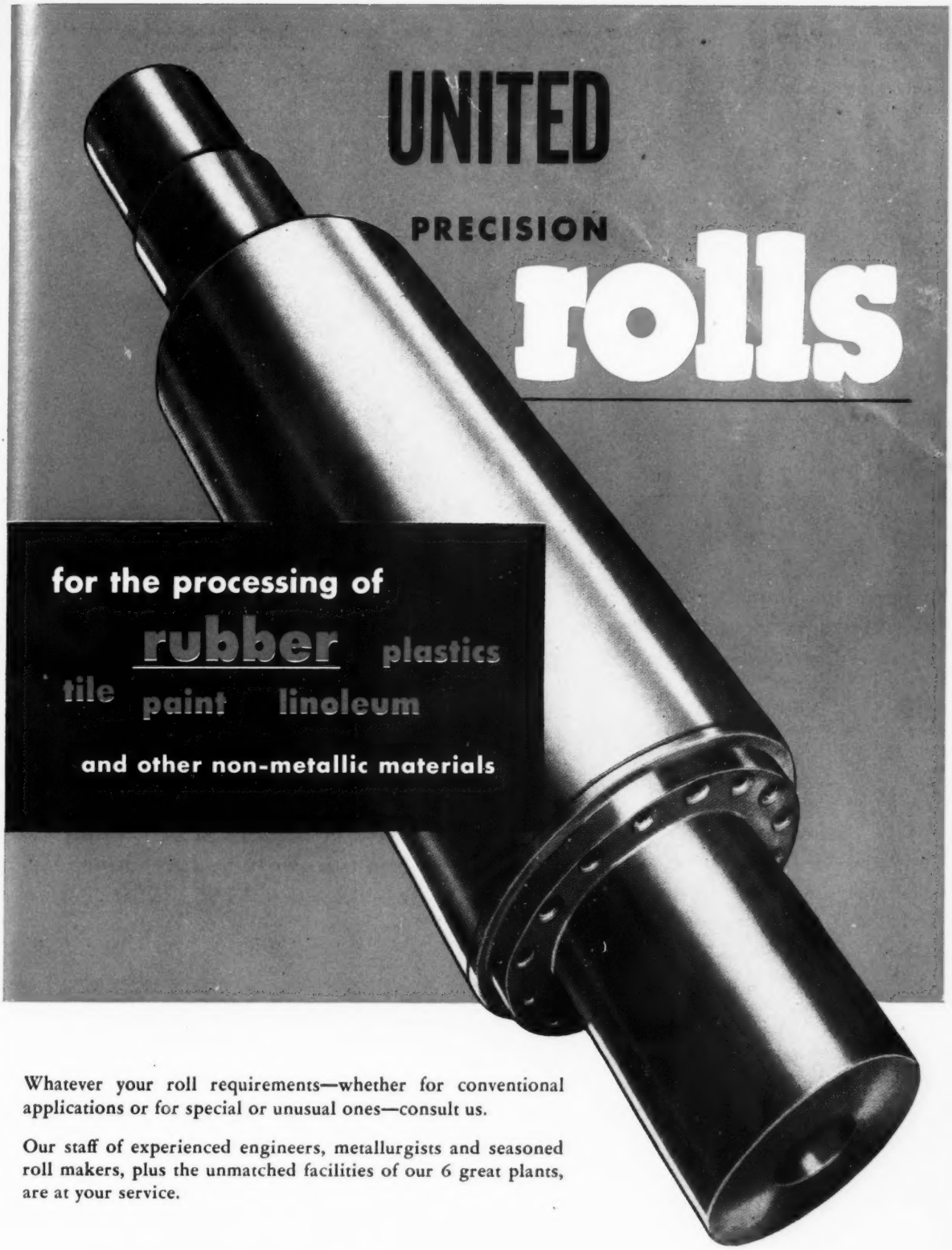
Joseph P. Muzzio

JOSEPH P. MUZZIO, president of Brooklyn Color Works, Inc., Brooklyn 22, N. Y., died of a stroke September 3 at Port Richmond, Staten Island. Mr. Muzzio established the company in 1917. Prior to that time, the deceased had been employed as a salesman by Morris Herrmann Co. and was one of the oldest, in length of service, in allied lines, in the dry color field.

Mr. Muzzio was an honorary member of the Elks. He was born in New York, N. Y., May 10, 1869.

Funeral services were held at the Silvie Funeral Home, Port Richmond, September 6, followed by interment in Valhalla Cemetery, S. I.

Mr. Muzzio leaves two sons, two daughters, two brothers, and five sisters.



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West

(*Continued from page 80*)

National Motor Bearing Co., Inc., Redwood City, Calif., is revamping its executive set-up in order to make fullest use of increased facilities resulting from its extensive expansion program. In consequence three new vice presidents have been elected: Park Q. Wray, in charge of sales; H. Kingsley Pohlman, in charge of manufacturing; and Milton C. Bulkeley, who continues also as company treasurer. Mr. Pohlman, most recently director of manufacturing for the company and its subsidiaries, previously had been president of the subsidiary, Arrowhead Rubber Co., Downey, Calif.

Patterson-Ballagh, Division of Byron Jackson Co., 1900 E. 65th St., Los Angeles 1, Calif., has announced that John B. Merritt has been promoted from general manager of Patterson-Ballagh to general manager and vice president of International Cementers, Inc., another Byron-Jackson division. James T. Workman, assistant to the president of Byron-Jackson, has been made general manager of Patterson-Ballagh.

Minnesota Mining & Mfg. Co., St. Paul, Minn., has established a regional sales office and warehouse at 1221 Dragon St., Dallas, Tex., to permit better service for customers in Texas and neighboring states. Officials in charge of the new office and warehouse are Walter F. Gruetzman, office manager; Ray Paulson, sales manager for abrasives and related products; and Fred Richardson, sales manager for cellophane tapes.

Accurate Products Co., Inc., has moved its operations from Culver City to San Diego, Calif.

Extruders, Inc., having outgrown its quarters at Culver City, Calif., has moved to 3232 W. Segundo Blvd., Hawthorne, Calif., where facilities are about triple the size of the former plant.

Baker & Collinson, Detroit, Mich., recently was appointed agent in Michigan for The American Resinous Chemicals Corp., The American Polymer Corp., Peabody, Mass., and their associated companies. During the past 50 years, Baker & Collinson has served industrial plants in Michigan in the paint, rubber, plastic, pharmaceutical, and paper fields. The firm maintains its own warehouse facilities in conjunction with its offices at 1200 Mt. Elliott Ave., Detroit. The Baker & Collinson sales staff, who cover the State of Michigan, will offer sales and technical service to all American Resinous and American Polymer customers in the area.

Commercial Rubber Co., 1601 E. 24th St., Los Angeles 11, Calif., is erecting a new office and warehouse on 23rd St. adjacent to its present facilities.

Compounding Ingredients — Price Changes and Additions

Plasticizers and Softeners

Santicizer 107, 141	*lb.*	$0.40 /	$0.4775
140	*lb.*	.3525 /	.43
160	*lb.*	.33 /	.4075

Vulcanizing Agents

Sulfasan R	*lb.*	1.50

United States Rubber Statistics — June, 1951

(All Figures in Long Tons, Dry Weight)

	New Supply			Distribution		Month-End
	Production	Imports	Total	Consumption	Exports	Stocks
Natural rubber, total	0	51,812	51,812	36,999	224	63,593
Latex, total	0	4,692	4,692	2,999	0	4,776
Rubber and latex, total	0	56,504	56,505	39,998	224	68,369
Synthetic rubbers, total	*67,257 †6,931	445	74,633	64,718	534	78,154
GR-S types‡	*61,489 †28	217	61,734	53,558	49	60,258
Butyl‡	*5,768	228	5,996	5,674	0	8,071
Neoprene‡	†5,450	0	5,450	4,258	371	6,476
Nitrile types‡	†1,453	0	1,453	1,201	114	3,349
Natural rubber and latex, and synthetic rubbers, total	74,188	56,949	131,137	104,716	758	146,523
Reclaimed rubber, total	33,509	20	33,529	30,999	1,416	40,268
GRAND TOTALS	107,697	56,969	164,666	135,715	2,174	186,791

* Government plant production.
† Private plant production.
‡ Includes latices.
SOURCE: Rubber Division, NPA, United States Department of Commerce, Washington, D. C.

Statement of India RUBBER WORLD

Statement of the ownership, management ,and circulation, required by the Act of Congress of August 24, 1912, as amended by the Acts of March 3, 1933, and July 2, 1946, (Title 39, United States Code, Section 233) of India RUBBER WORLD, published monthly at Orange, Conn., for October, 1951.

1. The names and addresses of the publisher, editor, managing editor, and business manager are: publisher, Bill Brothers Publishing Corp., 386 Fourth Ave., New York 16, N. Y.; editor Robert G. Seaman, 386 Fourth Ave., New York 16, N. Y.; managing editor, S. R. Hague, 386 Fourth Ave., New York 16, N. Y.; business manager, B. Brittain Wilson, 386 Fourth Ave., New York 16, N. Y.

2. The owner is: Bill Brothers Publishing Corp., Raymond Bill, Edward Lyman Bill, Randolph Brown, all at 386 Fourth Ave., New York 16, N. Y.

3. The known bondholders, mortgagees, and other security holders owning or holding 1% or more of total amount of bonds, mortgages, or other securities are: None.

4. Paragraphs 2 and 3 include, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting; also the statements in the two paragraphs show the affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner.

B. BRITTAIN WILSON
Business Manager

Sworn to and subscribed before me this 12th day of September, 1951.

[SEAL] HELEN M. VERLIN
Notary Public in the State of New York, Qualified in New York County, No. 31-9960500.
(Commission expires March 30, 1952)

Estimated Automotive Pneumatic Casings and Tube Shipments, Production, Inventory, July, June, 1951; First Seven Months, 1951, 1950

	July, 1951	% of Change from Preceding Month	June, 1951	First Seven Months, 1951	First Seven Months, 1950
Passenger Casings					
Shipments					
Original equipment	1,915,140		2,098,805	16,743,437	20,576,054
Replacement	3,248,214		3,512,893	20,454,960	27,744,972
Export	53,529		79,688	379,470	322,636
TOTAL	5,216,883	−8.34	5,691,386	37,577,867	48,643,662
Production	5,278,478	−6.94	5,672,086	37,076,473	45,681,000
Inventory end of month	2,538,650	+0.47	2,526,749	2,538,650	5,689,724
Truck and Bus Casings					
Shipments					
Original equipment	446,322		503,732	3,325,474	2,624,902
Replacement	877,743		926,131	5,794,570	5,333,669
Export	61,188		63,571	444,642	450,548
TOTAL	1,385,253	−7.24	1,493,434	9,564,686	8,409,119
Production	1,455,071	−6.12	1,549,989	9,870,925	8,038,643
Inventory end of month	1,047,128	+6.28	985,273	1,047,128	1,314,729
Total Automotive Casings					
Shipments					
Original equipment	2,361,462		2,602,537	20,068,911	23,200,956
Replacement	4,125,957		4,439,024	26,249,530	33,078,641
Export	114,717		143,259	824,112	773,184
TOTAL	6,602,136	−8.11	7,184,820	47,142,553	57,052,781
Production	6,733,549	−6.77	7,222,075	46,956,398	53,719,643
Inventory end of month	3,585,778	+2.10	3,512,022	3,585,778	7,004,453
Passenger (Including Motorcycle) and Truck and Bus Tubes					
Shipments					
Original equipment	2,361,850		2,600,311	20,092,528	23,221,023
Replacement	2,637,040		2,831,420	20,327,666	24,451,533
Export	73,107		68,255	470,553	414,522
TOTAL	5,071,997	−7.78	5,499,986	40,890,747	48,087,078
Production	5,177,859	−3.78	5,381,223	38,712,746	45,332,437
Inventory end of month	5,684,678	+7.04	5,310,930	5,684,678	8,450,296

NOTE: Cumulative data on this report include adjustments made in prior months.
SOURCE: The Rubber Manufacturers Association, Inc., New York, N. Y.

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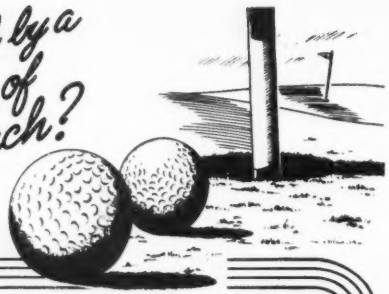

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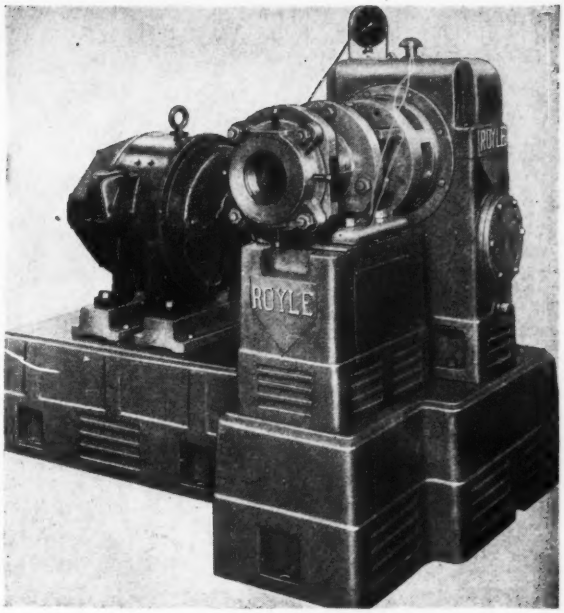

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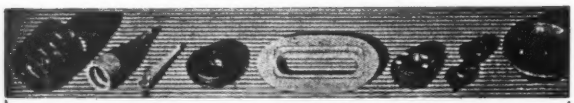

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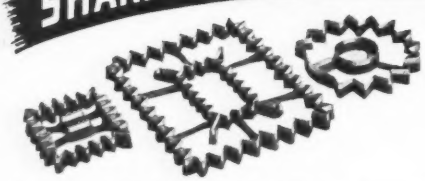

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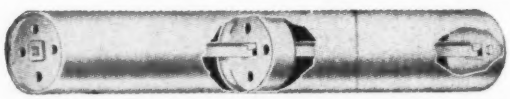

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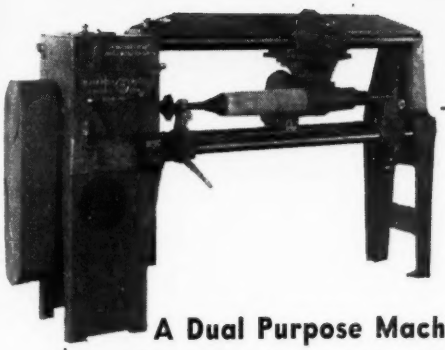

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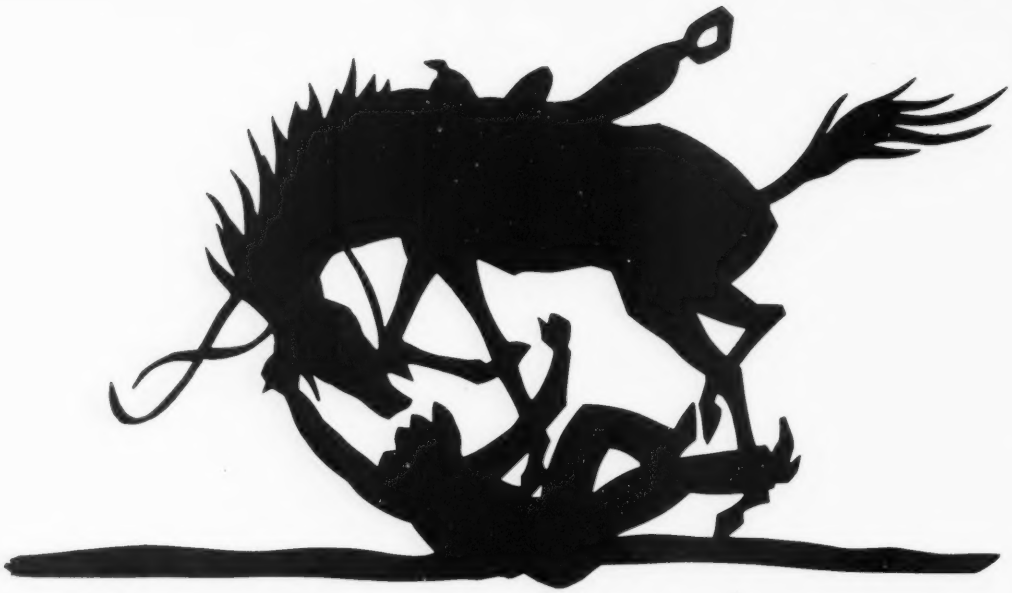

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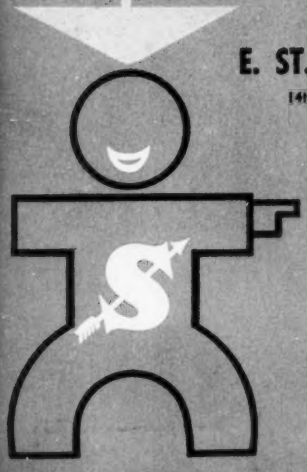

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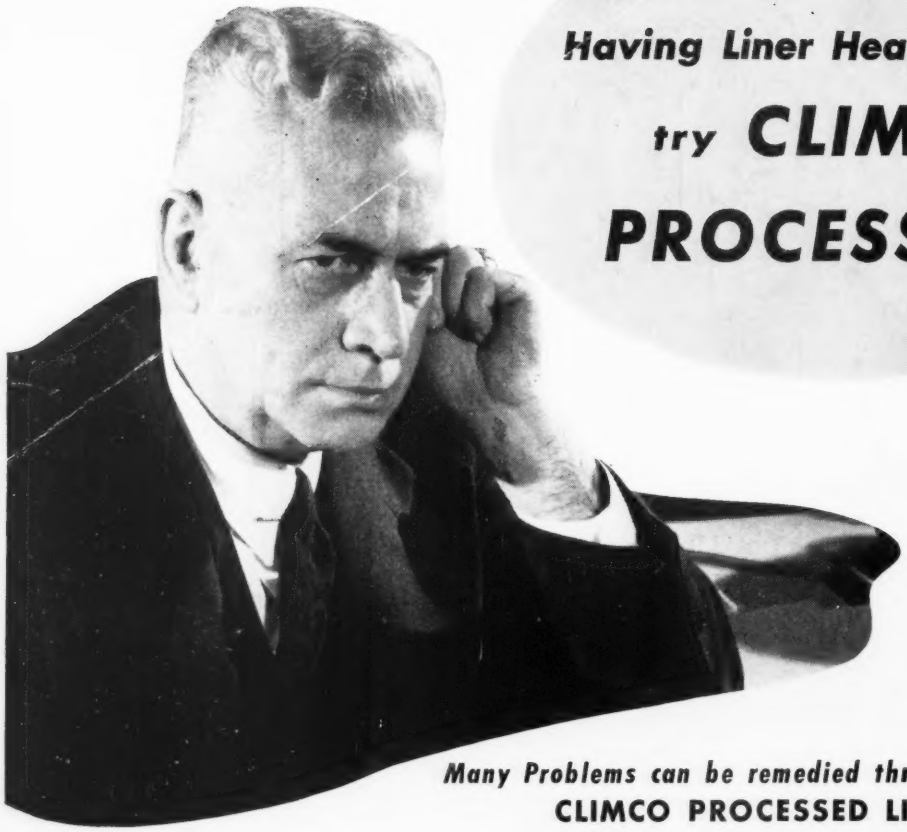

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